

Vol. XVI

APRIL, 1930

No. 4

copy 1

PROPERTY OF
DENTAL LIBRARY
UNIVERSITY OF MICHIGAN
DON'T MUTILATE OR
REMOVE

The International Journal of Orthodontia Oral Surgery and Radiography

ADVISORY EDITORIAL BOARD

CHARLES R. BAKER
OSCAR E. BUSBY
HAROLD CHAPMAN
ANGELO CHIAVARO
ADELBERT FERNALD
HENRY C. FERRIS
ABRAM HOFFMAN

CLINTON C. HOWARD
HARRY E. KELSEY
ALBERT H. KETCHAM
STERLING V. MEAD
OREN A. OLIVER
JAMES T. QUINTERO
CLARENCE O. SIMPSON

Editor ----- MARTIN DEWEY

Associate Editor ----- H. C. POLLOCK

Entered at the Post Office at St. Louis, Mo., as Second Class Matter

Published by The C. V. Mosby Company, 3523-25 Pine Blvd., St. Louis, U. S. A.

Buccal Tubes

Deeortho Band Material
for Anterior and Posterior Bands

WIRE-FORM SOLDER



Seamless Bands

DEEPEP WIRE
for Arches and Springs

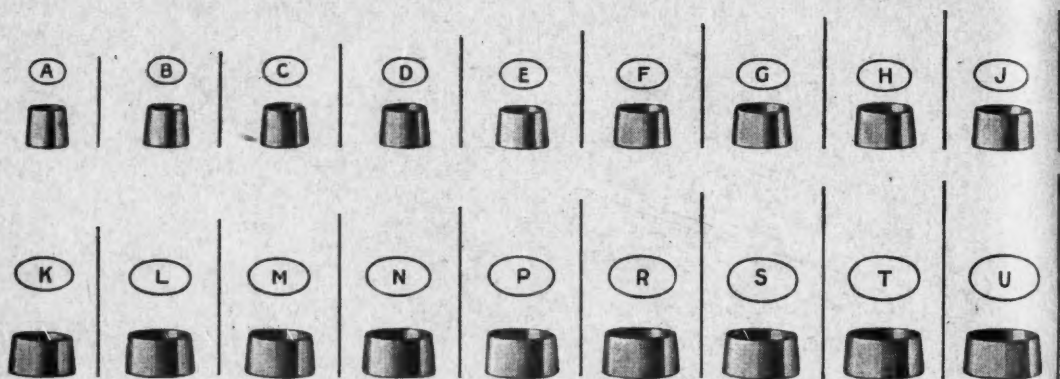
LINGUAL LOCK TUBES

THOMAS J. DEE & CO.

55 EAST WASHINGTON STREET

CHICAGO, ILLINOIS

WILL-GOLD SEAMLESS INCISOR BANDS



DESIGNED BY DR. HERBERT A. PULLEN

*Save Time and Allow Greater
Flexibility in Adapting*

THE use of Will-Gold Ready-Made Seamless Incisor Bands saves time by eliminating the cutting and soldering of band materials—and provides greater flexibility in adapting because of the absence of soldered joints. One of the eighteen graded sizes will fit any Incisor—upper or lower. The oval tapered shape approximates that of the tooth and makes possible a precise fit with a minimum of manipulation and adjustment.

The Will-Gold Seamless Incisor Bands—introduced a few months ago—together with the more familiar Will-Gold Seamless Molar Anchor Bands—widely used by Orthodontists everywhere for over two years—make up a complete line of bands which provides a ready-made band of the exact size and approximate shape of any tooth. Those who use them never go back to the old fashioned tedious method of cutting, shaping and soldering their own bands.

Bands are sold singly or in convenient boxed assortments. Assortment "C" contains two each of the eighteen Incisor Bands. Price, in U. S. A. \$12.65

[FOR SALE BY GOOD DEALERS EVERYWHERE]

Write for the complete story of Incisor and Molar Bands including Dr. Pullen's technique for their use

THE WILLIAMS GOLD REFINING CO., INC.

SAN FRANCISCO, CALIF.

BUFFALO, N. Y.

BRIDGEBURG, ONT.

WILLIAMS GOLDS
better because they are "Melted by Radio"

International Journal Orthodontia—April, 1930

The International Journal of Orthodontia, Oral Surgery and Radiography

(All rights reserved)

VOL. XVI

ST. LOUIS, APRIL, 1930

No. 4

ORIGINAL ARTICLES

DIAGNOSTIC METHODS IN ORTHODONTICS*

BY DR. JAMES T. QUINTERO, LYONS, FRANCE

Professor of Orthodontics, Ecole Dentaire de Lyon

I. HISTORICAL OUTLINE

METHODS of orthodontic diagnosis today bear no resemblance to what they were only forty years ago. One may say that until the last few years the diagnosis of the lesions under treatment was hardly attempted by the practitioner, as he was generally quite content to set the six anterior teeth approximately straight. The others could assume the most varied and irregular positions; no one took much notice of them.

In 1883, however, Isaac Davenport of Paris drew attention to the necessity of correct occlusion, and little by little it was recognized that this was undoubtedly important; but, as often happens, exaggeration began, and soon occlusion was considered all important. Angle first of all, taking it as the exclusive basis of orthodontics, built upon it his entire classification and system of treatment; the articulation of the maxillary and mandibular first molars served to establish the diagnosis and determine the treatment. This took place about the year 1900 (Fig. 1).

A little later, in 1905, Hawley of Washington, taking Bonwill's works as his starting point, established diagrams showing what the normal maxillary dental arch should be in each case. He therefore introduced into diagnostic methods a new element: the idea of comparative measurements of the arch, first, as it presents itself before the treatment, and second, as it ought to be after final results were obtained.

In 1908 Herbst of Bremen improved upon Hawley's diagrams, without introducing any new element into the question (Fig. 2).

*Read before the European Orthodontological Society's Congress, London.

In 1909 Pons of Lyons presented his dental index (Fig. 3), of which I have published below a completely developed table. The advantage of the dental index is that it permits an immediate approximative diagnosis of endognathism. Its exactitude is only very approximate—in spite of the large number of decimals given for each measurement—because experience shows that the arches constructed according to Hawley's or Herbst's diagrams, or the dental index, are geometrically alike, and this can evidently be true in but a small proportion of cases (Fig. 4). Moreover, decimals taken to one ten-thousandth of a millimeter are without interest, except for purposes of calculation, for it is impossible to obtain measurements that are correct within a tenth of a millimeter. That approximation, however, is sufficient to allow of establishing an immediate diagnosis, and, from this point of view, Pont's dental index constitutes an element which it is useful to retain.

In 1915 J. A. W. van Loon of Utrecht showed the relations between the superior maxilla and the facial bones, and by a complex method of maxillo-

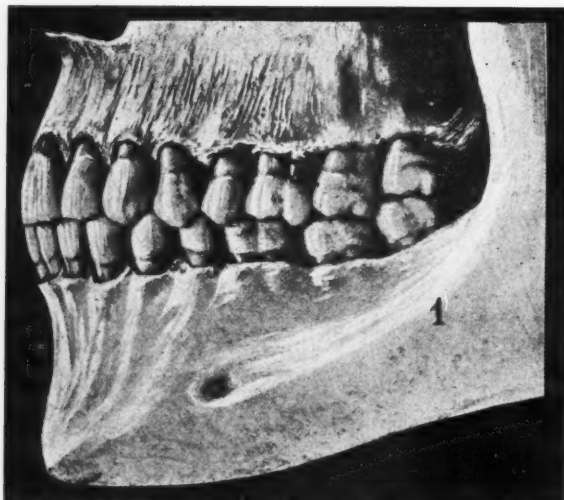


Fig. 1.

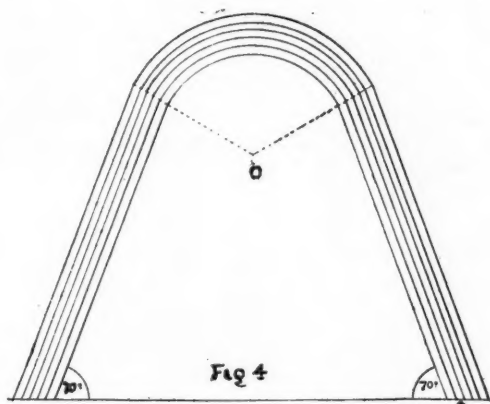
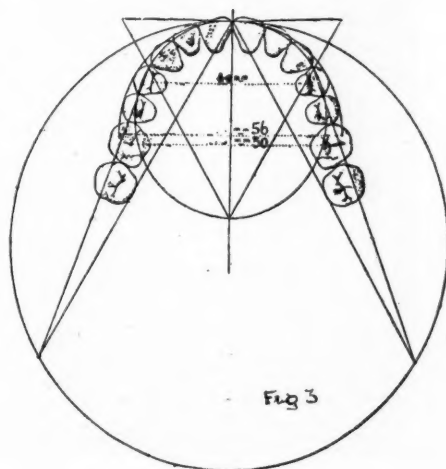
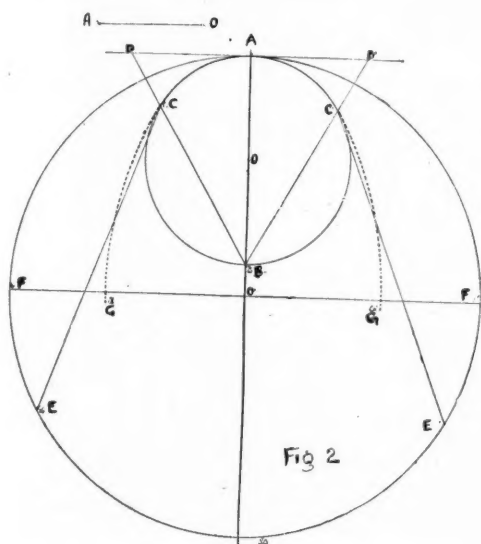
facial casts he established these relations in a strikingly objective manner, in his "cubus craniophor." This method makes apparent to us the necessity of considering the positions of the teeth and the development of the maxilla, no longer in relation to each other alone, but in their relations to the face and skull. This is, from an esthetic and functional point of view, of extreme importance (Fig. 5).

But van Loon's method was above all experimental. Five authors in particular have applied themselves more or less directly to its improvement: P. W. Simon of Berlin, S. Dreyfus of Lausanne, R. Schwarz of Bâle, E. Comte of Geneva, and especially G. Izard of Paris, whose work, dealing with both diagnosis and facial esthetics, is exceedingly precious.

In 1921 P. W. Simon gave the first practical method of dentomaxillo-facial measurement and examination, a method so complete that it includes the taking of photographs on a fixed scale (Fig. 6) and the obtaining of gnathostatic casts (Figs. 7, 8, 9), on which we can determine the Frankfort

plane (or a plane parallel to it), the fronto-orbital plane and the median-sagittal plane. The measurements to be taken are, in particular, the height of the cusps of the maxilla below the Frankfort plane, the angle this cusp line makes with this plane, and the outline of the palate, both in the transversal and in the anteroposterior directions.

In 1922 Dreyfus gave a simplification of this method which admits of direct transposition onto the cast of the Frankfort plane, with the orbital and auricular points, if desired. The nasion is also obtained by projection, with

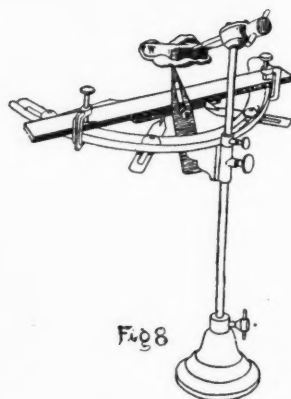
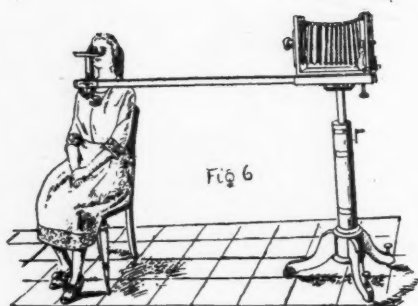
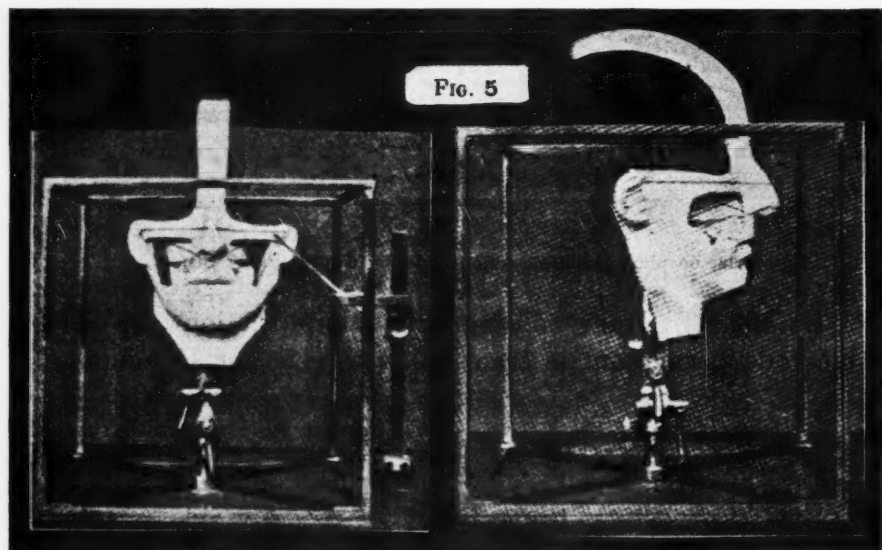


the indication of its height above the Frankfort plane (Figs. 10, 11, 12). The other measurements are the same as the preceding ones. There is some progress, therefore, in that Simon's facial bow, which does not allow of obtaining, with absolute accuracy, the Frankfort plane, is replaced by a gnathostat on which the guiding points of this plane are directly inscribed. Thus the cast, once it is poured, bears the same indications, and, by a very simple method, is found to have, for its upper surface, the Frankfort plane itself.

In 1923 R. Schwarz published his method of cephalometric measurements; but the apparatus needed to put this method into practice was so complicated

that it did not seem possible to apply it generally in general practice as yet (Figs. 13 and 14).

Then in 1924 E. Comte of Geneva, in a very thorough study of the subject, showed that the form of the normal maxillary dental arch could always be reduced to an ellipse (Fig. 15). But this notion alone, however important it may be, is not sufficient if one does not know how to calculate the curve which suits each individual case.



We now come to the very important work of G. Izard of Paris, who in 1925 reported that, according to measurements taken on a considerable number of *normal skulls* at the *Museum* in Paris, he had determined the lengths of the axes of the individual ellipse which should inscribe the maxillary dental arch in each case. The anteroposterior axis is equal to the distance from the biauricular line to the incisive point, while the transversal axis is equal to half the bizygomatic diameter, in the case of mesocephalic skulls; in the case of dolichocephalic, or of brachy- and hyperbrachycephalic skulls there are slight differences one way or the other.

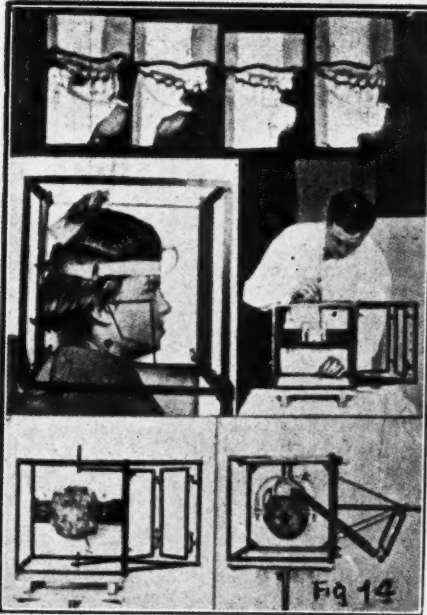
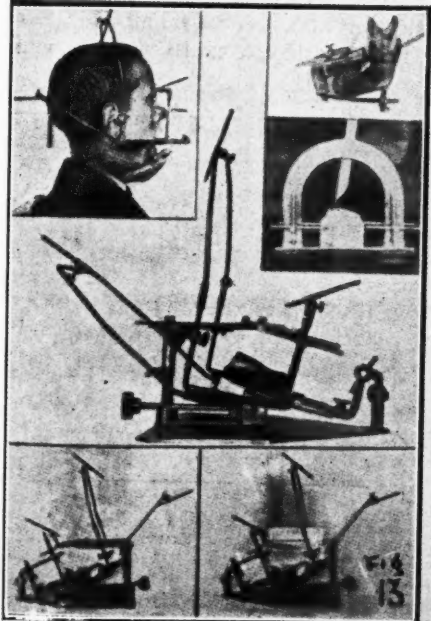
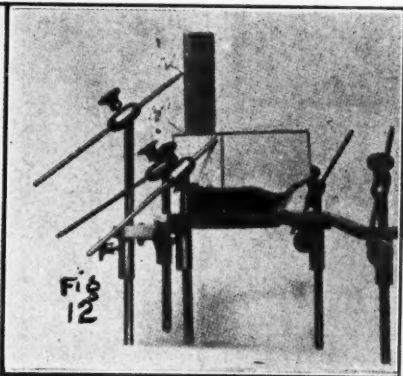
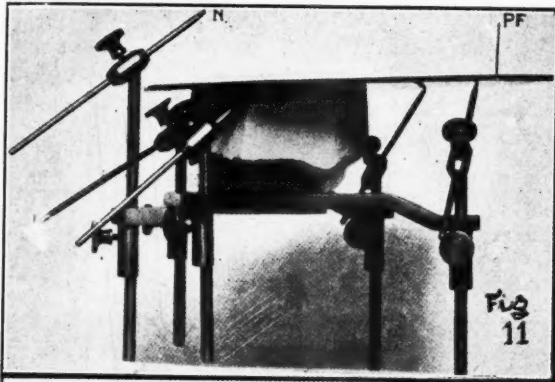
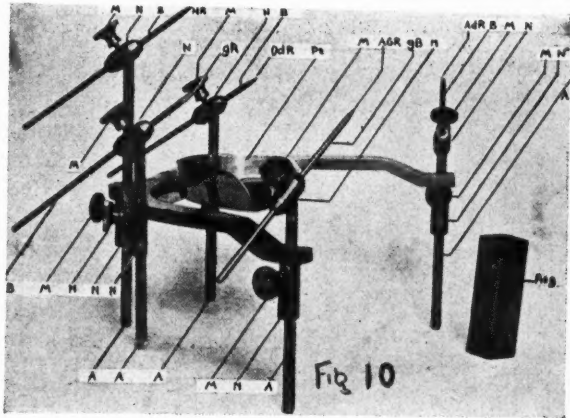
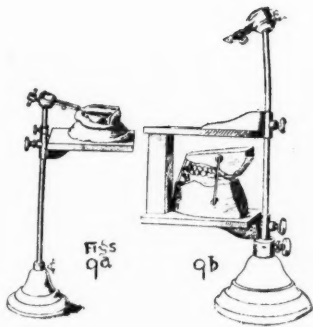


TABLE I*

CONCORDANCE OF PONT'S DENTAL INDEX WITH THE RADIUS OF HAWLEY'S DIAGRAM (I)
AND SIFFRE'S DIAMETER (IN MILLIMETERS)

I. DIAMETER OF THE FOUR MAXILLARY INCISORS	II. RADIUS OF THE ARC IN HAWLEY'S DIAGRAM	III. DISTANCE FROM THE CENTERS OF THE FIRST PREMOLARS	IV. DISTANCE FROM THE CENTERS OF THE FIRST MOLARS	V. DISTANCE FROM THE MESIOBUCCAL CUSPS OF THE FIRST MOLARS (SIFFRE)	I. DIAMETER OF THE FOUR MAXILLARY INCISORS	II. RADIUS OF THE ARC IN HAWLEY'S DIAGRAM	III. DISTANCE FROM THE CENTERS OF THE FIRST PREMOLARS	IV. DISTANCE FROM THE CENTERS OF THE FIRST MOLARS	V. DISTANCE FROM THE MESIOBUCCAL CUSPS OF THE FIRST MOLARS (SIFFRE)
20.0	15.00	25.00	31.25 ⁰⁰	35.00	30.0	22.50	37.50	46.87 ⁵⁰	52.50
20.2	15.15	25.25	31.56 ²⁵	35.35	30.2	22.65	37.75	47.18 ⁷⁵	52.85
20.4	15.30	25.50	31.87 ⁵⁰	35.70	30.4	22.80	38.00	47.50 ⁰⁰	53.20
20.6	15.45	25.75	32.18 ⁷⁵	36.05	30.6	22.95	38.25	47.81 ²⁵	53.55
20.8	15.60	26.00	32.50 ⁰⁰	36.40	30.8	23.10	38.50	48.12 ⁵⁰	53.90
21.0	15.75	26.25	32.81 ²⁵	36.75	31.0	23.25	38.75	48.43 ⁷⁵	54.25
21.2	15.90	26.50	33.12 ⁵⁰	37.10	31.2	23.40	39.00	48.75 ⁰⁰	54.60
21.4	16.05	26.75	33.43 ⁷⁵	37.45	31.4	23.55	39.25	49.06 ²⁵	54.95
21.6	16.20	27.00	33.75 ⁰⁰	37.80	31.6	23.70	39.50	49.37 ⁵⁰	55.30
21.8	16.35	27.25	34.06 ²⁵	38.15	31.8	23.85	39.75	49.68 ⁷⁵	55.65
22.0	16.50	27.50	34.37 ⁵⁰	38.50	32.0	24.00	40.00	50.00 ⁰⁰	56.00
22.2	16.65	27.75	34.68 ²⁵	38.85	32.2	24.15	40.25	50.31 ²⁵	56.35
22.4	16.80	28.00	35.00 ⁰⁰	39.20	32.4	24.30	40.50	50.62 ⁵⁰	56.70
22.6	16.95	28.25	35.31 ²⁵	39.55	32.6	24.45	40.95	50.93 ⁷⁵	57.05
22.8	17.10	28.50	35.62 ⁵⁰	39.90	32.8	24.60	41.00	51.25 ⁰⁰	57.40
23.0	17.25	28.75	35.93 ⁷⁵	40.25	33.0	24.75	41.25	51.56 ²⁵	57.75
23.2	17.40	29.00	36.25 ⁰⁰	40.60	33.2	24.90	41.50	51.87 ⁵⁰	58.10
23.4	17.55	29.25	36.56 ²⁵	40.95	33.4	25.05	41.75	52.18 ⁷⁵	58.45
23.6	17.70	29.50	36.87 ⁵⁰	41.30	33.6	25.20	42.00	52.50 ⁰⁰	58.80
23.8	17.85	29.75	37.18 ⁷⁵	41.65	33.8	25.35	42.25	52.81 ²⁵	59.15
24.0	18.00	30.00	37.50 ⁰⁰	42.00	34.0	25.50	42.50	53.12 ⁵⁰	59.50
24.2	18.15	30.25	37.81 ²⁵	42.35	34.2	25.65	42.75	53.43 ⁷⁵	59.85
24.4	18.30	30.50	38.12 ⁵⁰	42.70	34.4	25.80	43.00	53.75 ⁰⁰	60.20
24.6	18.45	30.75	38.43 ⁷⁵	43.05	34.6	25.95	43.25	54.06 ²⁵	60.55
24.8	18.60	31.00	38.75 ⁰⁰	43.40	34.8	26.10	43.50	54.37 ⁵⁰	60.90
25.0	18.75	31.25	39.06 ²⁵	43.75	35.0	26.25	43.75	54.68 ⁷⁵	61.25
25.2	18.90	31.50	39.37 ⁵⁰	44.10	35.2	26.40	44.00	55.00 ⁰⁰	61.60
25.4	19.05	31.75	39.68 ⁷⁵	44.45	35.4	26.55	44.25	55.31 ²⁵	61.95
25.6	19.20	32.00	40.00 ⁰⁰	44.80	35.6	26.70	44.50	55.62 ⁵⁰	62.30
25.8	19.35	32.25	40.31 ²⁵	45.15	35.8	26.85	44.75	55.93 ⁷⁵	62.65
26.0	19.50	32.50	40.62 ⁵⁰	45.50	36.0	27.00	45.00	56.25 ⁰⁰	63.00
26.2	19.65	32.75	40.93 ⁷⁵	45.85	36.2	27.15	45.25	56.56 ²⁵	63.35
26.4	19.80	33.00	41.25 ⁰⁰	46.20	36.4	27.30	45.50	56.87 ⁵⁰	63.70
26.6	19.95	33.25	41.56 ²⁵	46.55	36.6	27.45	45.75	57.18 ⁷⁵	64.05
26.8	20.10	33.50	41.87 ⁵⁰	46.90	36.8	27.60	46.00	57.50 ⁰⁰	64.40
27.0	20.25	33.75	42.18 ⁷⁵	47.25	37.0	27.75	46.25	57.81 ²⁵	64.75
27.2	20.40	34.00	42.50 ⁰⁰	47.60	37.2	27.90	46.50	58.12 ⁵⁰	65.10
27.4	20.55	34.25	42.81 ²⁵	47.95	37.4	28.05	46.75	58.43 ⁷⁵	65.45
27.6	20.70	34.50	43.12 ⁵⁰	48.30	37.6	28.20	47.00	58.75 ⁰⁰	65.80
27.8	20.85	34.75	43.43 ⁷⁵	48.65	37.8	28.35	47.25	59.06 ²⁵	66.15
28.0	21.00	35.00	43.75 ⁰⁰	49.00	38.0	28.50	47.50	59.37 ⁵⁰	66.50
28.2	21.15	35.25	44.06 ²⁵	49.35	38.2	28.65	47.75	59.68 ⁷⁵	66.85
28.4	21.30	35.50	44.37 ⁵⁰	49.70	38.4	28.80	48.00	60.00 ⁰⁰	67.20
28.6	21.45	35.75	44.68 ⁷⁵	50.05	38.6	28.95	48.25	60.31 ²⁵	67.55
28.8	21.60	36.00	45.00 ⁰⁰	50.40	38.8	29.10	48.50	60.62 ⁵⁰	67.90
29.0	21.75	36.25	45.31 ²⁵	50.75	39.0	29.25	48.75	60.93 ⁷⁵	68.25
29.2	21.90	36.50	45.62 ⁵⁰	51.10	39.2	29.40	49.00	61.25 ⁰⁰	68.60
29.4	22.05	36.75	45.93 ⁷⁵	51.45	39.4	29.55	49.25	61.56 ²⁵	68.95
29.6	22.20	37.00	46.25 ⁰⁰	51.80	39.6	29.70	49.50	61.87 ⁵⁰	69.30
29.8	22.35	37.25	46.56 ²⁵	52.15	39.8	29.85	49.75	62.18 ⁷⁵	69.65
30.0	22.50	37.50	46.87 ⁵⁰	52.50	40.0	30.00	50.00	62.50 ⁰⁰	70.00

*This Table is taken from J. T. Quintero's *Technique Orthodontique* (J. B. Baillière et Fils, Paris, 1928).

The bizygomatic diameter, *on the living individual*, measures about ten millimeters more than on the skull, because of the soft tissues. In practice, ten millimeters should therefore be subtracted from the measurement obtained on the patient, in order to make up for the thickness of the soft tissues. The remainder should be divided by two, and the result will give the length of the transversal axis of the ellipse which is to circumscribe his dental arch.

TABLE II*

NOMENCLATURE USED FOR DESCRIPTION OF DENTO-MAXILLO-FACIAL ANOMALIES

PARTS CONSIDERED	PREFIXES			RADICALS	QUALIFICA- TIVES
	Vertically going beyond the occlusal plane or not reaching it	Outside or inside the curve	Nearer or farther from the incisal point		
TEETH	Displacements: Parallel to an axis (or along one)	e or in	Bucco (labio) or linguo	Mesio or disto	GRESSION
	Round a hori- zontal axis	Bucco (labio) or linguo	Mesio or disto	VERSION	Coronal or apical Mesiolingual or mesioves- tibular, or distolingual, or distoves- tibular
	Round the ver- tical axis			ROTATION	
ARTICULATION	Vertical de- formations Supra or in- fra	Transversal deformations Extero or, entero or latero	Sagittal de- formations Antero or postero	CLUSION	Superior or in- ferior, par- tial or total, right or left
MAXILLAE	Hyper hypo	or Exo or endo	Pro or retro	GNATHISM	Superior or inferior
FACE	Hyper hypo	or Exo or endo	Pro or re	TRUSION	Superior or in- ferior labial, jugal, or chin

*This table, inspired by Izard's, of Paris, is taken from *Technique Orthodontique* by Dr. J. T. Quintero, Paris, 1927, J. B. Baillière & Fils.

The progression in diagnostic methods can, therefore, be established as follows:

- (1) Introduction of the notion of the importance of articulation.
- (2) Importance of facial harmony.
- (3) Importance of transversal development.
- (4) Importance of the relations of teeth and maxilla to the face.
- (5) Necessity of establishing for each case an individual diagram of the normal arch, taking into consideration the facial esthetics of the patient, instead of using ready-made diagrams, such as Hawley's or Herbst's.

II. SYMPTOMATIC DIAGNOSIS

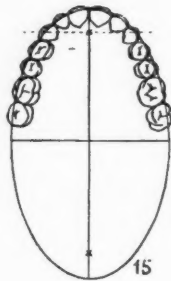
How shall we coordinate these different methods in order to diagnose a given case? We must take each question in turn and consider separately the face, maxilla, articulation and the teeth, looking, in every case, for anomalies in each of the three planes of space. We shall thus obtain a whole series of

symptoms, and by assembling these we will be able to make a symptomatic diagnosis.

Our guiding marks are constituted by the horizontal Frankfort plane, the vertical transversal fronto-orbital, fronto-nasal and fronto-glabellar planes, and the vertical median-sagittal plane. Our measurements will be made perpendicularly to each of these planes, except where the teeth themselves, considered individually, are concerned.

A. FRANKFORT PLANE.—The Frankfort plane passes through the auricular points (superior border of the external auditory meatus) and through the orbital points (the lowest points of the orbital ridge). When these points are joined on a profile photograph, the projection of the Frankfort horizontal plane is obtained. This plane constitutes the upper base of the casts made according to Dreyfus' method and Schwarz's.

B. FRONTO-ORBITAL PLANE.—By dropping a perpendicular to the Frankfort plane from the orbital point, we project on the photograph a vertical and transversal or frontal plane, described by P. W. Simon and named after him.



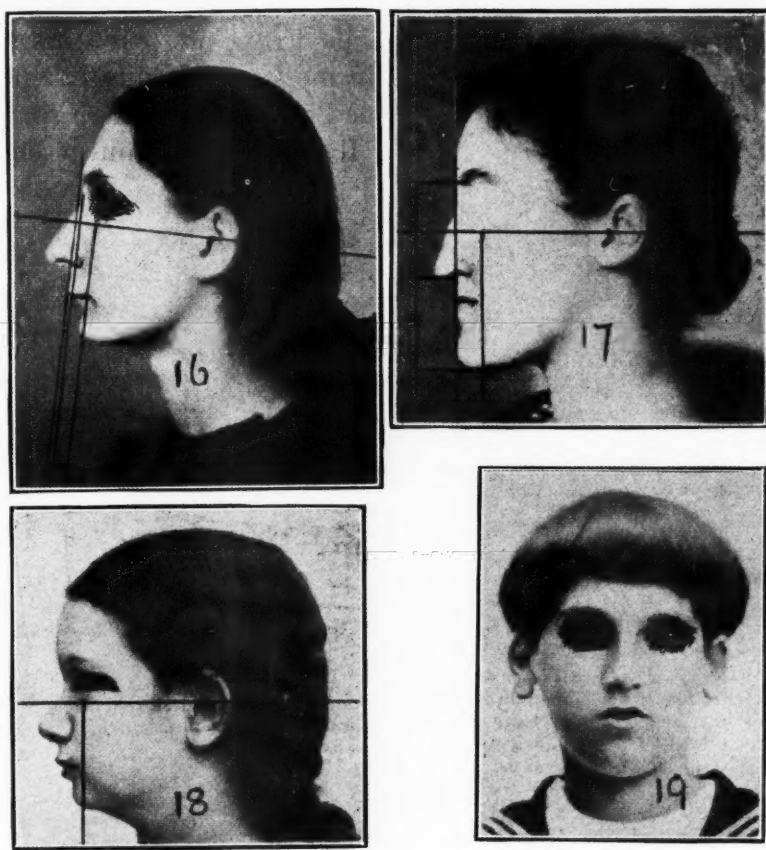
This fronto-orbital plane, or Simon's plane, usually passes through the angle of lips, and in normal cases, through the mental symphysis. The labial opening is generally perpendicular to it. If we refer this plane to our casts, we see that it usually passes through the maxillary canine, either through its cusp or through its distal half. By tracing this plane on the photograph of our patient, we can diagnose the anteroposterior anomalies of the chin (Fig. 16).

C. FRONTO-GLABELLAR PLANE.—By tracing a vertical line parallel to Simon's plane, but passing through the glabella, we project another frontal plane on to the photograph, Izard's plane, or the fronto-glabellar plane. This plane is tangent to the upper lip, in normal cases, and the soft tissues of the chin are midway between this and Simon's plane.

D. FRONTO-NASAL PLANE.—Dreyfus in 1922 described a vertical and transversal plane, which can be used as an anterior limit beyond which the incisors must not pass. This plane can be traced very easily on casts made from impressions taken with Dreyfus' gnathostat. A recent invention of the same author makes it possible to pour the cast and give it its final shape without any cutting or trimming, by use of a casting apparatus especially constructed for this purpose. This fronto-nasal plane is perpendicular to the Frankfort plane, and passes through the nasion. It is easily traced on the cast, slightly more difficult to trace on the profile photograph. Therefore I prefer to use it ex-

clusively on the gnathostatic models and use Izard's fronto-glabellar plane for the profile photographs.

E. MEDIAN-SAGITTAL PLANE.—There are different methods of transcribing the median-sagittal plane on the casts. Simon takes as starting point the palatal suture which is situated in the median-sagittal plane, in 80 per cent of the cases; but as nothing indicates the cases where the palatal suture is not median, this author takes, in the latter cases, a wrong starting point without knowing it. It would seem preferable to choose for extreme points, as is our own practice:

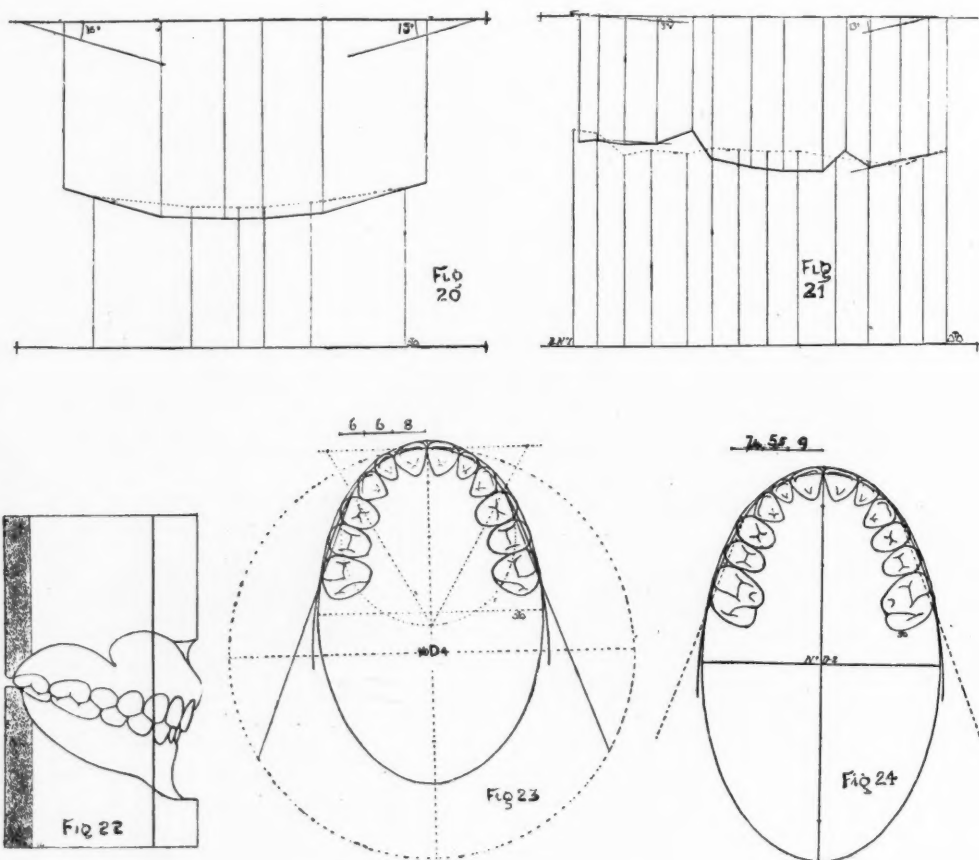


(1) The nasion which can easily be determined, as it is very accessible.

(2) The center of the biauricular line, an easy point to find, since both auricular points are equally accessible, and since Dreyfus' gnathostat makes it possible when pouring the cast to include them in the plaster and thus obtain, on the plaster itself, the tracing of the biauricular line. Since the extreme points of the line are thus known and are situated outside our zone of action, it becomes easy to trace the median plane (see Fig. 27). I think it necessary to emphasize the fact that the median sagittal plane need not be perpendicular to the biauricular line in every case, but only in those cases in which it corresponds to the palatal suture. The reason for this is that in marking this plane on our casts we unite the center of the biauricular line with the nasion, and in cases of asymmetrical development, the nasion may be slightly to one

side or the other of a perpendicular drawn from the center of the biauricular line.

We have now defined the various planes of space which are to help us to differentiate the anomalies of the various organs. Let us bear in mind that the anomalies of the face are but the outer visible expression of those of the underlying parts; our action on them will, therefore, always be indirect. Likewise the anomalies of articulation are the visible expression of those of one or the other of the jaws or of the teeth. We must not forget that our action



must always be applied to the teeth. Let us now refer these different planes to the face, maxilla, articulation and teeth and see under what conditions we can speak of normal or abnormal development.

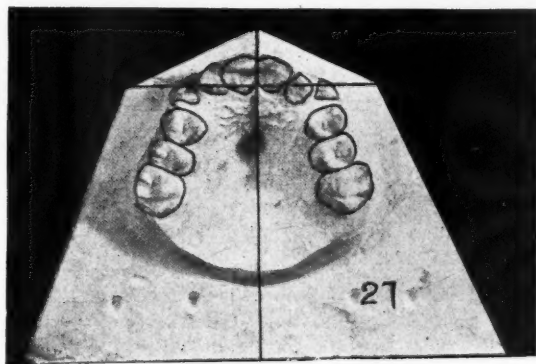
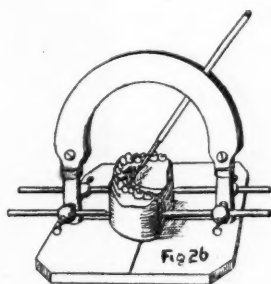
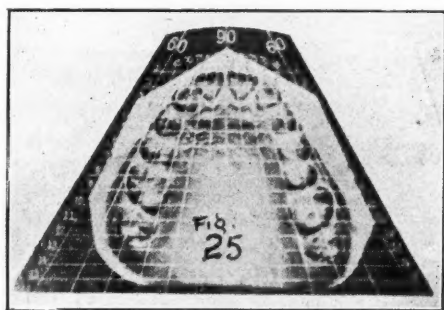
(I) FACE

Anomalies of the face are the outward expression of anomalies of the underlying structures and can be vertical, anteroposterior or transversal in direction.

1. VERTICAL DIRECTION.—In anthropology, the face is limited above by the line of eyebrows and below by the chin. It is divided by the nasal spine into two equal parts. If, therefore, our patient fulfils these conditions, we shall say that his face is normal in the vertical direction (Fig. 17). If, on the contrary,

we find an inequality of height in the upper and lower halves of the face, we shall try to discover whether the lower half is overdeveloped, which will constitute a hypertrusion, or whether it is underdeveloped, in which case there would be hypotrusion.

2. ANTEROPOSTERIOR DIRECTION.—We have pointed out that in the normal face, Simon's plane passes through the commissura labialis and the mental symphysis. In addition, Izard's plane just touches the upper lip and lies slightly forward of the lower lip and the teguments of the chin (Figs. 16, 17, 18). We are now in a position to diagnose the protrusions or retrusions of the upper or lower lip, and of the chin. These terms are clear enough and need no further explanations.



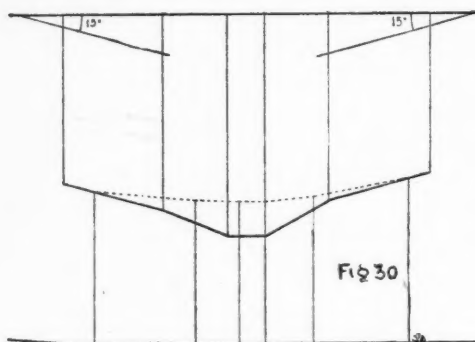
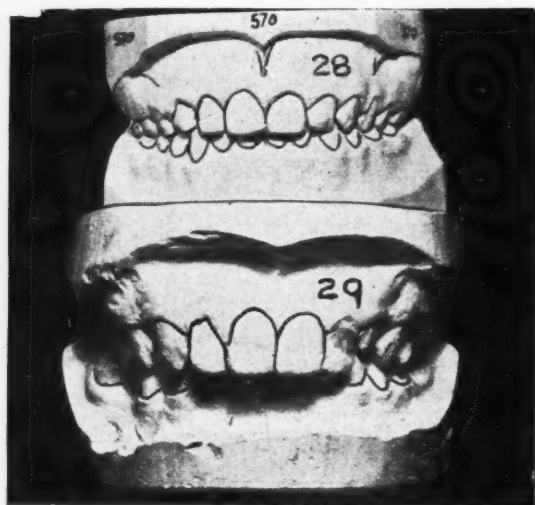
3. TRANSVERSE DIRECTION.—We possess no rule which allows us to define the transversal anomalies of the face; we must be content with comparing the two sides and verifying their symmetry. If one of them is overdeveloped we shall diagnose the case as one of exotrusion; if, on the contrary, it is underdeveloped, we will have endotrusion.

Let us point out, in passing, that we are practically without action on the transversal anomalies of the face, for they are rarely visible in our zone of influence, which is wholly occupied by adipose and muscular tissues (Fig. 19).

(II) MAXILLAE

Anomalies of the maxilla cause similar displacements of the alveoli and teeth and can only be gauged by comparison of position of the teeth to the guiding planes, in the vertical, anteroposterior and transversal directions.

1. VERTICAL DIRECTION.—Vertical anomalies are much more frequent than is usually supposed, and it is easy to discover them, if, by direct measurement, we determine the heights of the different cusps of the teeth below the Frankfort plane, which is taken as origin and base (Fig. 20). By uniting the points thus obtained and then measuring the angle which the line of the cusps forms with the horizontal line, we can find out the degree of anomaly. Identical angles are rarely found on the right and left sides. In normal cases, the average value of the angle thus formed is about 9 to 11 degrees. If a portion of



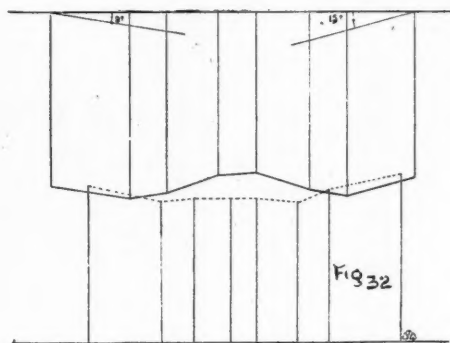
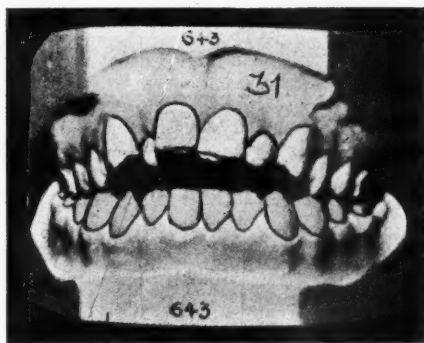
the maxilla does not reach the cusp line, it will be affected with hypognathism. If, on the contrary, it goes beyond the line, it will be a case of hypergnathism. This anomaly may be in a single portion of the maxilla, or in several of its parts. (Fig. 21.)

2. ANTEROPOSTERIOR DIRECTION.—To diagnose anteroposterior anomalies of the maxilla, we take as basis relations of the bone and teeth with the vertical fronto-orbital plane of Simon. We may use as anterior limit of normal variations Dreyfus' fronto-nasal plane, which passes through the nasion. Since the guiding points vary according to the dental arch under consideration, we shall study them separately.

A. Maxilla.—(a) Simon's plane. Normally, Simon's fronto-orbital plane passes through the canine, either at the tip of the cusp or in the distal half of the tooth (Fig. 22). If therefore, this plane passed through the tooth, in its anterior half, we should have a retrognathism; if, on the contrary, it passed through the premolar, we should have a prognathism (see Fig. 33).

(b) Dreyfus' plane. This plane allows us to establish the diagnosis of prognathism of the incisor region, in cases where the anterior teeth protrude beyond this plane. It is used to the best advantage on the gnathostatic models rather than on the profile photographs.

B. Mandible.—Here only Simon's fronto-orbital plane can be used. It passes over the mesial half of the first premolar, or in the space between this tooth and the canine. We shall thus have a basis for diagnosis which will permit us to differentiate between normal cases and those of prognathism or retrognathism, when Simon's plane is posterior or anterior to normal on the model (see Fig. 22).

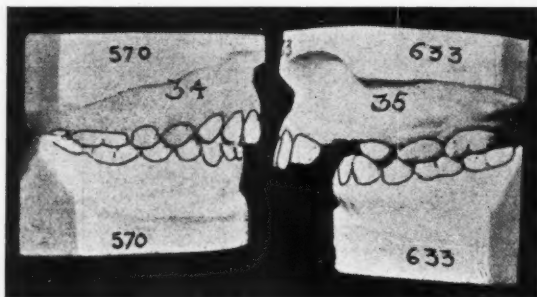
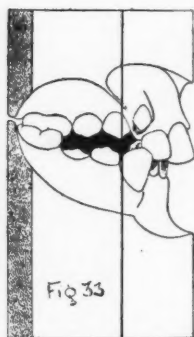


3. TRANSVERSE DIRECTION.—The diagnosis of transversal anomaly of the maxilla is based on the comparison of the case under consideration with the measurements obtained by means of Hawley's or Herbst's diagrams, or Pont's dental index, or better still the ellipse traced according to Comte's and Izard's indications (Figs. 23 and 24). The results are not always quite comparable; sometimes Hawley's and Herbst's diagrams will give a wider arch; sometimes, on the contrary, Izard's ellipse will circumscribe the other diagrams. The reason for this is that Hawley's and Herbst's diagrams are established according to the width of the teeth only, and are always geometrically alike (see Fig. 4), whereas Izard's method is distinctly individual, and takes into account, above all, the form of the head—and consequently that of the maxilla. It follows from this that it is a far more rational method, and that treatments based on the data thus obtained are more likely to be successful and definitive. It must be admitted, however, that in most cases the variations between the different methods are not very great, and that in spite of the criticisms that can be directed against the old methods (Hawley, Herbst, Pont) they nevertheless offer approximate exactitude which is often sufficient. This is why I have considered it useful to publish a complete development of the table of Pont's dental index, adding to it the corresponding values of the

radius in Hawley's diagram, and of Siffre's diameter, which is the normal distance (according to that author) between the mesiobuccal cusps of the first molars (see Table I).

By measuring different points of the arch it is possible to verify, by comparison with the diagram which suits the particular case, whether the maxilla is normal or not. If it is too narrow, then endognathism is present. From 0 to 5 millimeters the endognathism will be slight; from 5 to 10 millimeters it will be moderate; above 10 millimeters it will be considerable. If the maxilla is too wide we have exognathism.

Finally, the maxilla may be asymmetrically developed. Grünberg of Berlin was, I think, among the first to draw attention to the frequent asymmetry of the maxilla, and he devised his symmetroscope (Fig. 25) for the purpose of verifying this particular point. Here the determination of the median plane will be useful. Simon always takes as starting point the median palatal suture, which is normal in 80 per cent of the cases, according to his pupil Bendias (Fig. 26). This percentage appears to me to be insufficient, for



nothing draws our attention to the cases where the palatal suture is not median. As Simon starts from the palatal suture and deduces from it, by rotation at 90 degrees, the fronto-orbital plane, it follows that in abnormal cases there lies here a source of errors, which could easily be avoided by proceeding inversely, and first marking the transversal plane on the cast; this is very simple since we know two points which determine it. On the other hand, the nasion is a single and median point, situated outside our zone of influence, and lastly the auricular points are likewise outside our field of action. It is, therefore, evident that if we choose the middle of the biauricular line, and the nasion, to determine our median plane, we are likely always to obtain the correct result (Fig. 27). Very often this plane will coincide with the median palatal suture; when there is a divergence it will be because the raphe is not median, and the maxilla is asymmetric.

(III) ARTICULATION

The anomalies of articulation, like those of the maxilla and face, may be situated, with respect to the three planes of space, in the vertical, the antero-posterior and the transversal direction.

1. VERTICAL DIRECTION.—We know that in normal articulation the teeth of the superior maxilla overlap their antagonists slightly, the overbite being from about 2 to 3 millimeters in the incisor region (Fig. 28). Beginning with the premolars, the buccal cusps of the maxillary teeth articulate between those of the mandibular teeth, overlapping them on the buccal side, while the buccal cusps of the mandibular teeth take up their position on the occlusal surfaces of the maxillary teeth, opposite the buccal grooves of these teeth. There is,

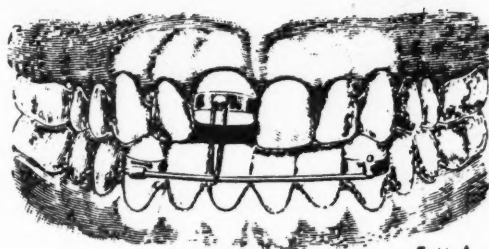
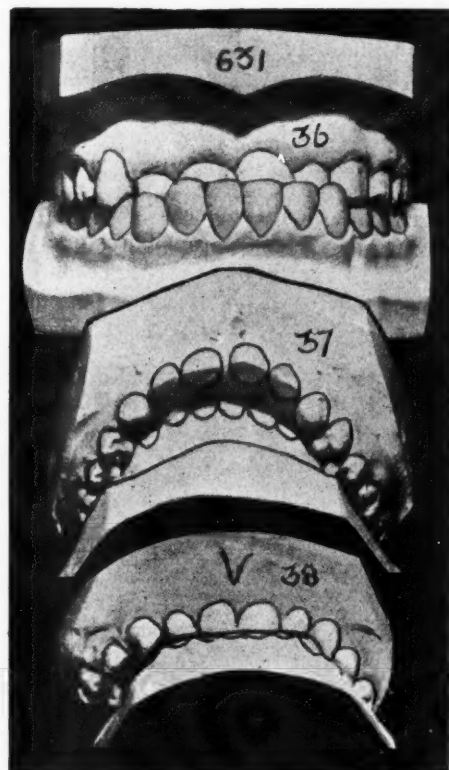


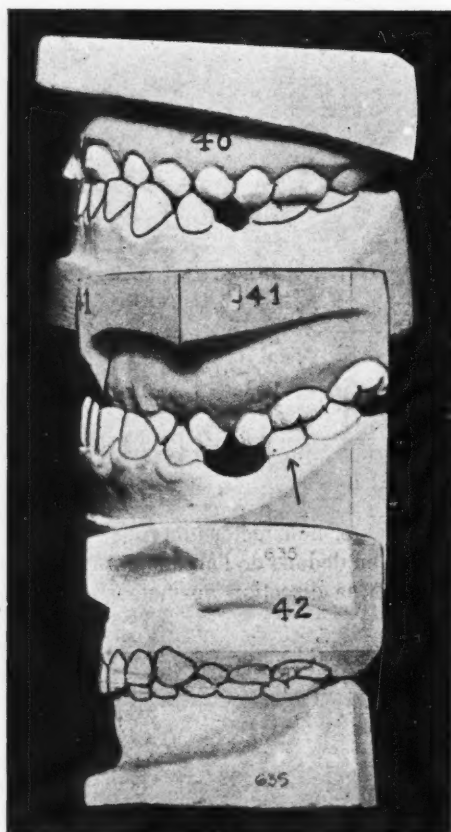
Fig 39

F H A

then, here also an overlapping of a few millimeters, which is particularly clear in the diagram of normal cusp heights given above (see Fig. 20). When the examination of the cast and cusp lines shows that this overbite is too deep, and that one or several teeth stand out beyond the line of occlusion, we say that there is a supraclulsion (Figs. 29 and 30). When, on the contrary, the cusps or incisal edges do not reach the line of occlusion, we have infraclulsion (Figs. 31 and 32). A careful analysis of the different elements of the diagnosis will

help us to determine if this is an uni- or bimaxillary anomaly, and whether partial or total (Fig. 33).

2. ANTEROPOSTERIOR DIRECTION.—In a rather old paper, Frey of Paris gave the nomenclature of the anomalies of articulation, in the anteroposterior direction. Later, in collaboration with Lemièrre and Villain, he corrected his first classification and described them, following the elliptical curve of the arch, for as he said in substance, if the maxilla and its anomalies can be described according to the three planes of space, it is because they are situated outside the oral cavity proper. It is by no means the same in the case of articulation



or of the teeth, which lie inside the mouth, and whose anomalies follow the same curve as the dental arch, in the linguo-buccal (or labial) as well as in the mesiodistal direction.

Careful observation of a large number of cases of anomalies has shown me that anomalies of articulation must be described in their relations to three general planes of direction, and not by following the curve of the arch. Let us take, for instance, a case in which the mandibular molars articulate with maxillary molars distally to normal, both on the right and on the left side. If this distal anomaly were repeated on each of the teeth of the mandible, we ought to find, on arriving at the median point, an enormous diastema between the central incisors, which, like the other teeth, should be displaced distally along their mesiodistal axis, and consequently widely separated one from the other. Now, such a condition really never arises; we always see, on the con-

trary, the mandibular arch displaced as a whole, either on both sides at the same time, or on one side only, so that the incisors are not distal but lingual to normal. It is much simpler and more rational, therefore, to describe these anomalies in the anteroposterior direction, which corresponds much more nearly to the reality.

Normally we have seen that the maxillary incisors and canines overlap the lower ones by a few millimeters. From the canine—which the Germans have so aptly named “Eckzahn,” the corner tooth—the overlapping continues, but now the mandibular teeth, contrary to what happens in the incisor region, are a little anterior to the maxillary teeth; the difference is half a cusp in normal cases, so that the mandibular first premolar occludes between the maxillary canine and first premolar, the mandibular second premolar between



Fig. 43.

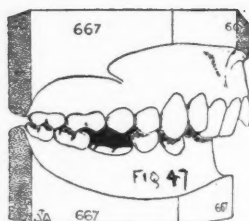
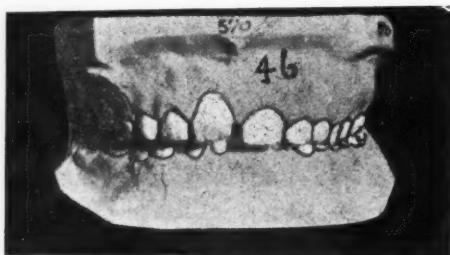


the two maxillary premolars, etc. Finally, the mesiobuccal cusp of the maxillary first molar occludes in the buccal groove of the mandibular first molar, or in the anterior groove when the mandibular molar has three buccal cusps (Figs. 1 and 34).

When the lower arch is partially or totally posterior to its normal position we say that there is partial or total inferior posterooclusion (Fig. 35). If the inferior arch is too far forward, we have to deal with partial or total inferior anterooclusion (Fig. 36). The same would be true of the upper arch if it were displaced. Attention should be called to the fact that the upper arch may also be displaced anteriorly, and that there may be, at the same time, upper prognathism with lower retrognathism—which may be taken for an extreme case of lower posterooclusion—or upper prognathism, the lower being normal, which gives the appearance of ordinary lower posterooclusion, or finally bi-maxillary prognathism—which gives the appearance of a normal articulation. It is necessary to analyze these cases carefully in order to establish proper differential diagnosis.

3. TRANSVERSE DIRECTION.—In the transverse direction, let us note that the median lines of the two arches ought to coincide, in the anterior portion. In

the lateral portions the buccal cusps of the maxillary teeth overlap the mandibular teeth on the outside, whereas the latter, on the contrary, are lingual to the maxillary teeth on the inner side of the arch. Let us make here, in so far as concerns the anomalies of articulation in the transversal direction, the same observation as in the case of the anteroposterior direction; they must be described in their relations to the three planes of space, so we shall not speak of vestibular or lingual anomalies, but of partial or total, external, internal or lateral anomalies. If our observation shows that one or several teeth articulate outside of their normal relation, they will be said to be in *exteroocclusion*; if they stand within, they are in *interoocclusion*. Generally the two arches are inversely affected, that is to say, an inferior *interoocclusion* most often accompanies a superior *exteroocclusion* (Fig. 37), but this reaction of an anomaly of one arch



on the other is not absolutely constant (Fig. 38). This description holds true so long as we consider the relations of the entire arches or of extensive parts of them. If we consider the articular relations of one tooth only, we would naturally describe it as being in lingual or buccal, distal or mesial occlusion. However, this particular point of view is not usually taken, as it is more natural to consider the relations of the arches to each other and the relations of a tooth to its neighbors and not to the teeth of the opposing jaw.

How should we differentiate between the condition of occlusion and the position of face and jaw? This is wholly a matter of properly understanding this method of diagnosis, and following out its different steps in their proper order:

- (1) Diagnosis of facial lines.
- (2) Diagnosis of maxillary and mandibular conditions.
- (3) The former having been determined, the occlusal relations will follow.

Let me repeat that occlusal relations are not the entire problem, as has been taught by the exponents of Angle's theories, but they form only a small part of it, entirely dependent upon face, jaw and tooth conditions. In fact, I consider the problem of occlusion as a mere detail compared to face and jaw abnormalities.

(IV) TEETH

With the anomalies of teeth considered individually, we abandon the method followed up to the present, of describing them in relation to the three planes of space, and we shall describe the purely dental anomalies, following the curve of the arch, in the mesiodistal direction, or, on the contrary, in the buccolingual direction, and finally in the vertical direction.

At the Second Congress of Stomatology at Paris, in October, 1925, and before the British Society for the Study of Orthodontics in London, in November, 1925, I showed that dental anomalies are due to two kinds of movements only: either parallel to an axis or around an axis.

1. **DISPLACEMENT PARALLEL TO AN AXIS.**—This displacement may be produced along any one of the axes: longitudinal (or vertical), mesiodistal or linguobuccal (or labial). It may even occur along two of these axes, or all three in certain cases. Attentive examination and careful measurements of the casts will allow the operator to clear up this point.

A. Vertical Axis.—The incisal edges and occlusal surfaces of the teeth are normally arranged along the arch, in a regular curve, at heights below the Frankfort plane which are easily determined by measurements. The irregularities of this cusp height will permit us to establish the diagnosis of eggression or ingression of a tooth or group of teeth (Fig. 39), provided that we make certain that the axes of the tooth have really remained parallel to their normal positions.

B. Bucco- (or labio-) lingual Axis.—On examining the dental arch, or the model we can determine whether the teeth displaced on the outside or inside of the arch have kept their vertical axis parallel to its normal direction. If so, there will be linguo-gression or bucco- (labio-) gression of these teeth, according to the direction which the displacement has taken (Fig. 40).

C. Mesiodistal Axis.—The teeth of each arch are normally in contact with each other at the extremities of their largest mesiodistal diameters, or thereabouts. If we find an abnormal space between two neighboring teeth which ought to be in contact, and if their vertical axes remain parallel to their normal direction, we shall know that there has been a gression of one or the other of these teeth. But which is the displaced tooth? This is not always easy to diagnose; but after a minute examination of the cast, and in particular an investigation of the points through which the vertical, frontal and sagittal planes pass, we shall be able to determine by the process of elimination the tooth or teeth which are in malposition. If the tooth has been displaced toward the incisal point there will be mesiogression. If, on the contrary, it has moved away from it, there will be distogression, taking for granted naturally that the tooth is not inclined on its vertical axis (Fig. 41 shows a distogression of a mandibular second premolar).

2. **MOVEMENT AROUND AN AXIS.**—Just as a tooth can be displaced along an axis, it can also be displaced around one of its axes. When this movement takes place around the vertical axis, there is a rotation of the tooth; but when the movement is around a horizontal axis it takes the name of version. The normal inclination of the teeth is shown in Fig. 42.

(a) Vertical Axis.—The teeth touch each other, in the same arch, approximately by their widest diameters, so that a continuous and fairly regular line

can be traced, passing through their points of normal contact. If this curve happens to be broken in any given point, and the mesiodistal axis of this tooth no longer corresponds with this imaginary line but has one of its extremities on the lingual side and the other on the buccolabial side of this fictitious line, we shall say that the tooth is rotated, and this displacement will be defined by indicating the displaced angle and the direction in which it is moved. In Fig. 43 is seen an incisor in mesiolingual rotation. Fig. 44 shows several rotated incisors.

(b) *Bucco- (or labio-) lingual Axis*.—When a tooth is separated from its direct neighbor by an abnormal space, and an examination of the cast shows that the root is inclined in such a way that the apex occupies a nearly normal position, and only the crown deviates from the normal, we say there is a version. When the version is toward the incisal point, there is mesioversion. When, on the contrary, it takes place in the reverse direction, there is disto-version (Fig. 45).

(c) *Mesiodistal Axis*.—When a tooth is within or without the arch, its crown alone being displaced and the apex remaining in its normal position, the displacement thus produced is either a bucco- (labio-) version, as in Fig. 46, or a linguo-version, as in Fig. 47, according to the direction in which the movement is effected.

III. CAUSAL DIAGNOSIS

We shall establish, with the help of the above indications, the symptomatic diagnosis of our patient's lesions, for the face as well as for the maxilla, articulation and teeth. With a little practice one gets accustomed very quickly to this sort of mental gymnastics, which require a very careful observation of the facts and which the annexed table gives the nomenclature with all its special terms. More difficult and also more delicate is the causal diagnosis. If certain etiologic factors are indeed well known to us, how many others escape us, and how many are as yet but hypotheses. L. Frey of Paris showed in 1922 the existence of local causes and general causes which may be summed up as follows:

ETIOLOGY OF MALOCCLUSIONS ACCORDING TO L. FREY

(A) LOCAL CAUSES			
Location	Causes	How Produced	Effects
I. TEETH	1. Abnormalities of the teeth (a) Of form (b) Of number (c) Of location (d) Odontomes	Hypertrophy, atrophy, conerescence Supernumerary or congenitally absent teeth Malposition of tooth germs	Malocclusions of one or more teeth; versions, rotations, gressions
	2. Premature loss of deciduous teeth, and loss of permanent teeth	Extraction, extensive caries of crown or root, trauma, nonresorption of roots	
	3. Tardy loss of deciduous teeth	Nonresorption of roots	
	4. Tardy eruption of permanent teeth		
	5. Faulty habits	Finger, lip, tongue sucking, cheek-biting	Malocclusions of the teeth and sometimes even maxillary malformations
	6. Unbalanced muscular tonus	Mouth-breathing or amputation of the tongue	

(A) LOCAL CAUSES

<i>Location</i>	<i>Causes</i>	<i>How Produced</i>	<i>Effects</i>
II. ALVEOLI	1. Hypertrophy	After extractions of opposing teeth and in inferior posterior occlusion	Super-occlusion (close bite)
	2. Atrophy	Sclerosis	Infra-occlusion (open bite)
III. MAXILLA	A. Congenital malformations		
	1. <i>Mandible</i>		
	(a) Atrophy	Micrognathia hemiatrophy agnathia or from ankylosis, etc.	Lower retrognathism (some of these forms are incompatible with life)
	(b) Hypertrophy	Hereditary, often	Lower prognathism, usually familial
	2. <i>Maxilla</i>		
	(a) Atrophy	Micrognathia of incisor region and underdevelopment of nasal process	Retrognathism and hypognathism
	B. Acquired malformations		
	1. <i>Mandible</i>		
	(a) Atrophy	Osteomyelitis, acquired hemiatrophy, cicatricial retraction	Lower retrognathism and vertical and transversal malformations
	(b) Hypertrophy	Obstetric prognathism Hypertrophy of the tongue	Lower prognathism, also vertical and transversal malformations
	(c) Simple malformations	Opening of the angle of the jaw	Mandibular "obtusism" (with open bite)
	2. <i>Maxilla</i>		
IV. TEMPORO-MANDIBULAR ARTICULATIONS	(a) Simple malformations without atrophy	Mouth-breathing, faulty habits, lack of muscular balance by amputation of the tongue	High vault and narrow arch
	(b) Acquired atrophy	Decalcification, neuritis, facial paralysis, mouth-breathing	Upper retrognathism and endognathism
	(c) Acquired hypertrophy	Rickets, endocrine disturbance	Overexpansion of upper arch, with at times entire loss of occlusion
	A. Congenital deviations are rare		
	B. Acquired deviations		
	1. Simple displacements	Faulty positions	Sliding of condyle, forward or backward
	2. Muscular contractions or paralysis	Hypertrophied tonsils, cicatricial contraction	False prognathism Posterior sliding of condyle

(B) GENERAL CAUSES

	<i>Causes</i>	<i>How Produced</i>	<i>Effects</i>
I. HEREDITY	A. Normal heredity		
	B. Teratologic heredity		
	1. Achondroplasia	Shortening of condylar and basilar portion of occipital and backward tendency of nasal portion of face, mandible remaining normal	Superior distal malocclusion
	2. Cleidocranial dysostosis	Forward displacement of upper portion of the face	Superior mesial malocclusion
	3. Craniofacial dystostosis	Early synostosis of skull bones and reduction of facial bones	False mandibular prognathism: superior distal malocclusion
	4. Familial pyostosis	Osteospathyrosis, leontiasis ossea, oxycephaly	Abnormal development of maxilla and consequent malocclusions
	5. Familial anomalies	Hereditary transmission	Dental anomalies of number, size and location; congenital atrophy or hypertrophy of maxillae
	C. Pathologic heredity Hereditary syphilis	Direct action on teeth, bones or temporo-mandibular joint or indirect action on the individual by predisposition to disease or anomalies	
II. RICKETS		Infections, chronic intoxications, digestive toxi-infections, syphilis, tuberculosis, prolonged bronchopneumonia, chronic pyodermitis, etc.	Malformations of maxillae
III. FAULTY NUTRITION		Endocrine disturbance, thyroid or pineal glands, food deficiency	Atrophied teeth and maxillae, hypertrophy of mandible (acromegaly) Dyscalcification

In 1924 G. Villain and B. de Nevrezé, studying the prophylaxis of dental malpositions and maxillary malformations, showed at what ages the different causes of anomalies become evident, with their relative value, and in a synoptic table they indicated that up to 2 years the general causes are more important than the proximal causes, which are in turn more important than the local causes; from 2 to 6 years it is the proximal causes whose importance is the greatest, whereas local causes pass to the second rank, and general causes come last. Finally, from 6 to 12 years local causes come first of all, proximal causes after them, with general causes last of all.

These authors classify the causes as follows:

A. FROM 0 TO 2 YEARS OF AGE

(I) *General causes:*

- (1) Dyscalcification.
- (2) Rickets.
- (3) Pathologic heredity (syphilis, tuberculosis, ethylism).
- (4) Endocrine disturbances.
- (5) Alimentary insufficiency (avitaminosis).
- (6) Weakness.

(II) *Proximal causes:*

Bad habits (finger, lip or tongue sucking, etc.).

(III) *Local causes:*

Retroversion of maxillary incisors.

B. FROM 2 TO 6 YEARS OF AGE

(I) *Proximal causes:*

- (1) Mouth breathing.
- (2) Bad habits.
- (3) Hypertrophy of frenum labii.

(II) *Local causes:*

- (1) Dental causes: (a) decay of deciduous teeth; (b) early loss of deciduous teeth; (c) early eruption of permanent teeth.
- (2) Maxillary causes: (a) familial malpositions; (b) mandibular prognathism; (c) bimaxillary protrusion; (d) bimaxillary retrusion; (e) bimaxillary atrophy.

(III) *General causes:*

- (1) Dyscalcification.
- (2) Dystrophic heredity.
- (3) Polycaries of general origin.

C. FROM 6 TO 12 YEARS OF AGE

(I) *Local causes:*

- (1) Dental causes: (a) tardy eruption of permanent teeth; (b) tardy loss of deciduous teeth; (c) early loss of deciduous teeth; (d) over-size teeth in undersize jaw; (e) supernumerary or absent follicle.
- (2) Maxillary causes: (a) in the sagittal direction—mandibular prognathism, bimaxillary protrusion, bimaxillary retrusion, inferior retrusion; (b) in the transversal direction—maxillary atrophy; (c) in the vertical direction—naso-mental diminution or naso-mental exaggeration of height, with open bite.

(II) *Proximal causes:*

- (1) Mouth-breathing.
- (2) Adenoid vegetations.
- (3) Bad habits.
- (4) Lack of muscular balance.
- (5) Temporary mandibular arthritis.

(III) *General causes:*

- (1) Lack of calcium salts.
- (2) Polycaries of general origin.

It is impossible to indicate exactly the etiology of each kind of malformation, although Frey attempted such a description in 1922, for causes apparently alike often produce very different anomalies.

It is by examining each case carefully and closely questioning the patient and family that we shall be able to trace the origin of the lesions under observation. We must not forget the importance of the endocrine glands, and of their disorders, nor that of the weight and height, in relation to the age of the child, indications of which have been given by Dreyer in his excellent work on physical fitness.

IV. CONCLUSIONS

What, then, will a diagnosis of dento-maxillo-facial malformation resemble? It will be a collection of more or less concordant symptoms, a sort of syndrome, very variable in its form, according as the anomalies affect the face, the maxilla, the articulation, or the teeth. Let us note that the symptoms may be distributed over all these parts or over one or more of them only. Their treatment will be both causal and symptomatic: causal because that is one of the essential conditions to success; symptomatic because all the symptoms that the examination reveals must be attacked directly and simultaneously, if possible. The more elaborate diagnosis arrived at by this method will in no manner make the treatment easier except in so far as it will permit the orthodontist to know exactly *what* is wrong and how to correct it; but as for simplifying appliances or methods of handling cases, on the contrary it may tend to complicate both to a certain extent, but at any rate it helps the orthodontist to find out just why and how his case is abnormal. It is therefore of the utmost importance that we should investigate minutely each of the symptoms revealed to us by a careful examination of the case, and discover, as far as possible, the causes which have produced the anomalies. Let us not forget that an exact and patient research of all the symptoms can alone help us to establish a correct diagnosis, from which follows the appropriate treatment, whereas an error in diagnosis will lead to faulty therapeutics, which will end in failure.

REFERENCES

*The sign * indicates a work forming part or all of a volume.*

1. Angle, E. H.: *Malocclusion of the Teeth and Fractures of the Maxillae. Philadelphia, 6th ed., 1900, S. S. Shite.
2. Bendias: Die sutura palatina in ihrer Lage zur Medianebene des Kopfes, Ztschr. f. zahnärztliche Orthopädie 16: 33, 1924.
3. Bennette, Norman G.: *The Science and Practice of Dental Surgery, London, 1st ed., 1914, Waverly Book Co., Ltd.
4. Bonwill, W. G.: *The Geometrical and Mechanical Laws of Articulation of the Human Teeth in *American System of Dentistry, Philadelphia, vol. 2, p. 496, Lea Brothers & Co., 1887.
5. Comte, E.: *Recherches sur la forme de l'arcade dentaire supérieure normale, Thèse de Genève, No. 25, 1923. Buchdruckerei Berichthaus, Zürich, 1924.
6. Davenport, I. B.: The Significance of the Natural Form and Arrangement of the Dental Arches of Man, With a Consideration of the Changes That Occur as a Result of Their Artificial Derangement by Filling or by Extraction of Teeth, Dental Cosmos 29: 413, 1887.
7. Dreyer, George: *The Assessment of Physical Fitness by Correlation of Vital Capacity and Certain Measurements of the Body, With Tables, London, 1920, Cassell & Co.
8. Dreyfus, S.: *Le diagnostic en Orthodontie ou Orthopédie dento-maxillo-faciale, Thèse de Genève, 1922. Province Dentaire, Lyon, 1922.

9. Frey, L.: Essai de terminologie des malpositions dento-maxillaires, *Odontologie* 44: 529; 45: 49, 282, 365, 1910.
10. Frey, L.: Etiologie générale des malocclusions par malformations et par malposition des dents et des maxillaires, *Province Dentaire* 8: 57, 1922.
11. Frey, L., Lemiere, R., et Villain, G.: Terminologie des malpositions maxillo-dentaires, *Odontologie* 47: 145, 314, 1912.
12. Grunberg, J.: Das Symmetroskop. Apparat zur Untersuchung der Symmetrie bezw. Asymmetrie des menschlichen Zahnbogens, *Oesterreichisch-Ungarische Vierteljahrschrift für Zahnheilkunde* 27: 169, 1911.
13. Hawley, C. A.: The Determination of the Normal Arch and Its Application to Orthodontia, *Dental Cosmos* 47: 541, 1905.
14. Herbst, E.: Mathematische Bestimmung des normalen oberen Zahnbogens vor Beginn der Behandlung einer Anomalie, *Ztschr. f. zahnärztliche Orthopädie* 2: 90, 1908.
15. Izard, G.: L'expansion maxillaire transversale en orthopédie dento-faciale. Rapport au Congrès de Stomatologie, Paris, 1924. *Rev. de Stomatol.* 26: 729, 1924; 27: 1, 113, 1925.
16. Pont, A.: De l'indice dentaire en orthodontie, *Le Laboratoire et le Progrès dentaire réunis*, Paris 6: 404, 1909.
17. Pont, A.: Essai de classification des malocclusions, *Province Dentaire* 9: 245, 1923; 10: 310, 1924.
18. Quintero, J. T.: Du déplacement des racines dans le sens vestibulaire au cours des traitements d'orthopédie dento-faciale, *Rev. de Stomatol.* 27: 1211, 1925.
19. Schwarz, R.: Neue cephalometrische Methoden und Apparate, und ihre Anwendung in die Orthodontie, *Schweiz. Monat. f. Zahnheilkunde* 33: 465, 647, 1923.
20. Simon, P. W.: Ueber eine neue Einteilung der Gebiss-Anomalien auf Grund der gnathostatischen Untersuchungsmethoden, *Ztschr. f. zahnärztliche Orthopädie* 13: 10, 1921.
21. Van Loon, J. A. W.: A New Method for Indicating Normal and Abnormal Relations of the Teeth to Facial Lines, *Dental Cosmos* 57: 973, 1093, 1229, 1915.
22. Villain, G. L., et de Nevreze, B.: Prophylaxie des malformations maxillaires et des malpositions dentaires chez les enfants, *Province Dentaire* 10: 169, 1924.

DISCUSSION

The *President* said that although the latter part of the paper was very largely concerned with nomenclature which was not approved by the International Committee on Nomenclature, it was at the same time a very interesting exposition of the anomalies which occurred.

Dr. A. L. Hipwell congratulated Dr. Quintero upon his scientific paper, a paper which must have taken weeks of good hard work to prepare. He should like to offer a remark that after Dr. Quintero had given all his diagnoses he had at last come back to Angle as being the simplest and most unique of diagnoses. If too much study was given to some writers on the subject things became too complicated and people were discouraged in applying the methods, whereas Angle had gone into those things twenty-five years ago, and in his view there had been no improvement either in Europe or America with regard to his diagnoses.

Dr. P. J. J. Coebergh said that on the following day he would have the pleasure of showing some lantern slides, and would then refer to what Dr. Quintero had shown that morning.

The *President* said he had no doubt Dr. Quintero would be then prepared to answer any remarks that were made in the discussion on Dr. Coebergh's contribution.

Dr. Quintero said he did not know whether Dr. Hipwell understood him, but believed he said that having gone through Simon's work he had come back to Angle. That was not what he did say. He did not come back to Angle at all, and his only allusion to Angle was to say that his classification was insufficient and that it only considered a small part of the problem. What it did consider was all very good, but it was only a very small part; it considered the occlusion in the anteroposterior direction, but there were many other things to be considered in diagnosis. Otherwise Angle's classification would be all right. He should be very pleased to answer anything Dr. Coebergh might ask him on the morrow.

AN ATTEMPT TO SOLVE THE PROBLEM OF THE LAPSING OF
TREATED CASES THROUGH THE STUDY OF
INTERNATIONAL ORTHODONTICS*

BY A. C. LOCKETT, L.D.S., R.C.S., ENGLAND

THE study of international orthodontic history, conditions and problems has always been of interest to me and has become increasingly so of recent years. The First International Orthodontic Congress, held in New York in August, 1926, has, perhaps, done more to make this study of greater interest to us here in Europe than anything that had happened previously. This interest cannot but grow into greater proportions in the future. Those of us who were fortunate enough to be present at that congress organized by the American orthodontists through the agency of their efficient president and organizer, Dr. William Fisher, Dr. Waugh, his secretary, and his band of helpers were amply repaid in ways too numerous to mention for the visit—yet mention must be made in a spirit of appreciation of the lavish kindness and generous hospitality which our American friends bestowed on all the members of foreign countries who attended the congress. The congress was a great success, and so satisfied were the organizers of the good which resulted that I believe I am giving no secrets away when I state that there is a prospect and hope that in the year 1930 we shall hold the Second International Orthodontic Congress here in Europe. Plans are already afoot for bringing this hope into the realm of a certainty. Speaking unofficially, I think I am right in saying that the governing body of the First International Orthodontic Congress has power to act until a second governing body has been elected, and I believe this first governing body can and will decide the place and time of meeting for the second congress. It is not unlikely that London may be selected, and I believe this selection will prove to be a wise one. May I, therefore, be permitted to make a few suggestions for our consideration in the event of London being selected:

The creation and formation of the Second International Orthodontic Congress would come together easiest on the following lines:

The British Society for the Study of Orthodontics should be asked to be the central local organizing body in conjunction with the existing working organization of the British Dental Association; an outline of all the duties of these two bodies is not necessary at the moment.

The American Society of Orthodontists through its Interrelations Committee should be asked to take charge of the Western Hemisphere as it appears on the map.

*Read at a meeting of British Society for the Study of Orthodontics.

The European Orthodontological Society with an Interrelations Committee should be asked to cooperate with the American Society of Orthodontists Committee and take charge of the Eastern Hemisphere.

A plan of this sort will distribute the work and responsibility and meet the requirements of organizing a successful congress.

Our duty here in Europe and the British Isles is, I feel, one of some responsibility to keep this second congress in our minds and in our studies and work, so that we may at that time present to our foreign confrères a true and organized picture of our requirements, our difficulties and the problems which, from day to day, call for solution in our practices; we will, in like manner, be ready to receive our American friends and those of the countries and parts of the British Empire outside of the European belt of nations in the same spirit as we shall ask them to meet us.

The organization of this congress is going to be one of some difficulty, and we here in the British Isles and in Europe will be expected to take some big and active part in its formation and operations. Looking back on the first congress for a few lessons in the organization of the second, we find many points worthy of imitation. The two points which impress me most on which improvement is advisable are:

(1) In place of a very long list of papers and little or no discussion, I would suggest a considerable reduction in the number of papers, longer and better machinery for discussion, and more of the question and answer procedure.

(2) On the assumption that the second congress lasts four days, I think that (a) two days should be devoted to and set aside for short courses of instruction by the recognized bodies of practical experience and thought on specified subjects of urgent importance, and that the men present should be divided into about eight groups to attend these courses in rotation; (b) half a day should be devoted to one or two interesting debates led by two men with their supporters and opposed by two other men with their band of supporters; this procedure would make an interesting afternoon.

The British Society for the Study of Orthodontics in its own quiet, dogged and typically English way has convinced me that there is no more broad-minded and serious-thinking body of men on orthodontic problems in any part of the world today. I am proud of my membership and any small part I may have played in its early days. This Society owes much to all its presidents and officers of past years, but most of all to its early presidents, Messrs. Badeock, Northeroft and Sim Wallace, Mr. H. Chapman for his long, efficient, painstaking and unselfish term of office as secretary. The mantle of this office has fallen on our promising and cheerful secretary, Mr. Packham, and I can see a lively time in front of him leading up to 1930 and the Second International Congress.

The European Orthodontological Society through its president and officers wishes to pay this Society homage and gratitude for its friendly and hearty co-operation in past years in its annual meetings held in London, and looks forward to years of cordial and sympathetic effort which, at the present time,

strike me as being so necessary in the individual part which each society will be asked to undertake in the organization of the Second International Orthodontic Congress.

I propose to make some reference to the part Europe played in the First International Orthodontic Congress and to state my humble opinion on what I feel ought to be a general line of policy, which European orthodontic societies might do well to adopt as their considered conclusions, which European conditions of general practice and necessities of parents and patients demand.

It is true that the contributions in papers from members from Europe were not accepted by our American friends on scientific matters in the same matter-of-fact way as some of their own valuable contributions; this was only natural. Let no one, however, conclude and imagine that deep in the hearts of the leaders of thought and action across the water these European contributions had been forgotten and unnoticed—far from it. We have always accepted their teachings and written experiences on their face value and put them to the test here in Europe. We have been told by many of our American visitors of the present political and scientific American orthodontic conditions, and we have told them of our own. There is a great deal of sympathy between us on this matter, yet for the purposes of the future we shall be well advised to leave domestic matters of other people alone. I have no fear but have every confidence in American orthodontic conditions being straightened out in a creditable manner in their own way and time.

What does concern us is our own, and I venture to hope that a few suggestions which I shall offer may be a small contribution toward outlining a policy and plan which will be a blessing to those of us who practice orthodontics in conjunction with general dentistry. We shall see more specialists in England and on the Continent in future than exist at present; I look forward to that. Nevertheless for the present the bulk of orthodontic treatment is and will continue to be done by the general practitioner for many years. There is much that a general practitioner can copy from the experience and teaching of the specialist, but the general practitioner has opportunities of observation over many years on his cases which the specialist has not. You will find that the general practitioner, keen student of orthodontics, will in the future make many valuable contributions which specialists will be glad to imitate.

Now for the attempt at a solution of the lapsing of cases. It is a fact, generally accepted, that it is impossible to conduct an orthodontic practice successfully in conjunction with a general practice. I am in agreement on that for the simple reason that up to the present the teaching, methods and plans of treating cases and all the procedure relating thereto have been of a character eminently suited to the specialist only. The general practitioner was supposed to gather just what crumbs of comfort he could.

We cannot get away from the fact, whether we like it or not, that here in Europe, and certainly in the British Isles, orthodontic treatment is, and will continue to be, conducted in general practice to meet the needs and requirements of the people who are our patients, and it is up to us to see that orthodontic treatment in general practice is going to be possible, and map out

for ourselves, in conjunction with experiences in other parts of the world, just what portions of those teachings and experiences are suited to our conditions, leaving alone what we find and know to be unnecessary or useless to us.

The basis of the plan and policy I wish to suggest should embrace the following characteristics, and it is based chiefly to meet the needs of the general practitioner student of orthodontics:

(1) The rights and the best interests of the child in future years, after treatment, should be our first consideration, taking all the existing and future circumstances and conditions under which treatment is contemplated into account.

(2) The plan of treatment should be one which, as near as we can tell and know, will lead to an assured result, and one which will not lapse again into malocclusion. It should be as simple and short as possible and carried out according to a plan based on a correct diagnosis. If the diagnosis provides for extractions, these extractions should be the correct teeth at the most suitable time in relation to the future denture as a whole, and particularly so on the important factor of caries of the teeth, absorption of the roots and general inflammatory condition of the soft tissues.

(3) That our convictions born of experience and observation should be fearlessly stated, whether they are in agreement with what were supposed to be recognized modern laws or teachings, and that we should keep on saying so until some one can prove us wrong, on the standard of permanent results.

I admit that it is no easy matter to live up to all there is contained in this policy in the face of a large opposition in different parts of the world and here at home, but no harm will be done if we have a good try. It is a generally accepted opinion that treatment on the normal occlusion basis is desirable as an ideal; it is also known by the supporters of this ideal, as well as by its opponents, that normal occlusion from malocclusion can be and is accomplished, but it is admitted by all that permanent results in adult life in a very large number of cases cannot be promised. Thank heaven we are all agreed on that, and on this point of agreement the hope and promise of the future exist. This interesting position appears to me much in the following light. Here is an agreement with a difference, the difference being that the normal occlusionist, i.e., the teacher and believer, who says that on no account should extraction be resorted to, is prepared to take the risk of malocclusion in the end of many cases, because he maintains that by the extraction of teeth you cannot have ideal occlusion, even if you do not get a relapse.

The opposition maintains that by extraction in certain cases carefully thought out in plan, you obtain a result which may not be ideal occlusion, but that your risk of a relapse is reduced to a minimum, and that the denture as a whole suffers least from causes not always under your control. The difference appears small, it is true, but that difference means an awful lot to the patient, and what is more, it means most to the practice of orthodontics and its desirable reputation which I feel ought to be safeguarded, and is today jeopardized.

The policy which I have suggested is, to all intents and purposes, one for the needs of the general practitioner student of orthodontics, and it is

put forward with the hope that its adoption here or abroad will do more to safeguard the reputation of the orthodontic profession than anything else can do in years to come. This small difference in our point of agreement opens out a large field of operations and discussion which are full of possible errors and mistakes in both camps. Abundant evidence is provided by the many cases which one sees from time to time in practice which have been treated with extraction wholly unsatisfactorily simply for the need of a carefully thought-out plan in conjunction with the extraction.

My experiences and observations in practice have convinced me that, given an opportunity, under favorable conditions, of, say, six years for treatment and retention, there are certain types of cases, very much in the minority in England, which will respond to treatment without extraction, and that all other types will not remain in occlusion without relapse unless extraction is performed.

This lapsing problem, therefore, seems to hang on the word *type*. I have long felt the need of a classification of type, but have never been able to produce one. I was still more impressed with the necessity of a type classification to work with a malocclusion classification after reading that long and interesting article in the INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY AND RADIOGRAPHY of October, 1923, by Dr. Varney E. Barnes, Cleveland, Ohio, who, I am told, practiced orthodontia in general practice for years before he specialized. The paper is entitled "A Study of Third Molar Impaction Associated With Orthodontic Retention." It was with a feeling of grateful appreciation and joy that I came across a classification of racial types according to physical characteristics by Dr. Potter of Kansas City, and the more I see of it and its application in practice the more I am convinced that up to the present it is the best in existence, although there are some features of it I do not like. With his permission I will submit his classification to you in tabulated form and with, side by side, my interpretation of its relation to Dr. Angle's classification of malocclusion. (You will find it in the INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY AND RADIOGRAPHY, March, 1925.)

DR. POTTER'S CLASSIFICATION IN CONJUNCTION WITH DR. ANGLE'S
CLASSIFICATION

DR. POTTER	DR. ANGLE
<i>Racial Type A. Small Patients.</i>	
1. Both father and mother small.	} Class I. Class II, Div. 2, and subdivisions.
2. Small bone development.	
3. Usually underweight.	
4. Arches narrow and short.	
<i>Racial Type B. Average Patient.</i>	
1. Father large, mother small, or vice versa.	} Class II, Div. 1. Class II, Div. 2.
2. Height and weight vary.	
3. Normal bone development.	
4. Arches usually wide—length varies.	
<i>Racial Type C. Large Patient.</i>	
1. Both parents large.	} Class I (small percentage). Class II, Div. 2, and subdivisions (small percentage). Class III (large percentage).
2. Normal height and weight.	
3. Arches full as to length and width.	

With apologies to Dr. Angle.

You will notice that this classification deals with treatment, and not much is said about retention. For the purposes of simplicity I contend that all irregularities of the teeth brought about by a number of causes verge on a state of impaction—simple or complicated, visible or invisible. The actual correction of the irregularity or simple and visible impaction of all the teeth from the first molars forward is today a comparatively straightforward operation, with occasional very difficult examples. If there were no second and third molars I do not believe this treatment of the teeth of both jaws from the first permanent molars forward would lapse again into malocclusion. The lapsing period commences on the arrival of the second molar in cases treated early, and on the arrival or attempted arrival of the third molars, and here we have the state of complicated and invisible impaction. I do not wish to be misunderstood. My reference to impaction of the third molar where irregularities of the teeth exist does not necessarily imply that the third molar is always apparently impacted; it may not appear to be, but it is for the reason that through lack of normal development it cannot find room for eruption—in other words, the wretched thing has no business there. If it were possible, by surgical means, to remove every third molar in every case on the earliest opportunity of a case of developing irregularity, I believe the lapsing problem would be considerably mastered, and certainly so in types of cases which seem to be more influenced or susceptible to lapsing than others. So far this is not practicable, and any attempt to perform this operation at the time it would be advisable and necessary would do a lot of harm in other ways. As this procedure is not advisable, we are driven to the unenviable thought of removal of the second molars where the condition of the first molars is good and free from caries or possible disintegration leaving the third molars to take their places.

Dr. Potter's contention is:

(1) That in racial types A and B in his classification embracing Angle's Class I and Class II, Divisions 1 and 2, if all the first molars are sound in health and good in structure there are racial types of cases which cannot accommodate the third molars on account of physical limitations, and that in these cases the second molars should be extracted from choice.

(2) If the first molars have large cavities, or a cavity which has been filled, and radiograms indicate that at some future time the closeness of the filling to the pulp cavity may bring about the death of the pulp, in this case he would extract the first molars, provided the second molar is in a healthy condition; two healthy molars should be left. On this point please let me say that in any case where the loss of the first molar is contemplated on Dr. Potter's grounds, it should be done three or four months before the eruption of the second molar. Doing it at this time, and at this time only, do you ever make it possible, without the use of appliances, for the second molar and second premolar to approach a normal point of contact in the strictly mutual position. He maintains that the age of the patient is the least important factor of the subject, and that where mandibular and maxillary development is not sufficient to accommodate the third molars and thereby permit an estab-

lished occlusion of the other teeth, you are justified in extracting the second molars.

In cases where the third molars have erupted and brought about a lapsed result of a treated case he says one is justified in extracting the molar (first, second or third) which is in the most weakened condition; on this point I am not in complete agreement. It might easily be found that four of the premolars might preferably be sacrificed, and that many other conditions had to be taken into account.

I am in entire agreement with Dr. Potter in saying that classifying cases by types of malocclusion only is not sufficient to obtain a comprehensive diagnosis, and that to obtain the correct diagnosis we need a combination of racial type classification according to physical characteristics, and the classification of malocclusion.

Now I will read you exactly what Dr. Potter says:

"This classification is the keystone of my diagnosis. In illustration of the use of the type classification, if you are handling a case of Racial Type A and Class I malocclusion, you can be definitely certain that in the majority of cases you will never have room for the third molars. So in your diagnosis and prognosis you must consider the effect of the third molar on your corrected occlusion. You will find the proportion of cases that will not accommodate third molars in Racial Type B to be about 75 per cent or in the ratio of three to one.

"Type C is the only full classification that will accommodate the third molars. This type of patient is usually of the northern Scandinavian parentage, or from certain districts of Russia or Scotland. The pure negro also belongs to this type. No race will long remain within the Type C class that lives the modern life with its soft prepared food and lack of rough diet, as it is a known fact that the change in diet and living of the human race is gradually lessening the stature of the individual, and the degree of mandibular and maxillary development.

"By the application of the standard classification of malocclusion in correlation with our racial type classification, we are aided in determining the point, or points, in the mandibular or maxillary arches where we are desirous of obtaining bone development, and to better determine the time for the removal of second molars.

"First we will take up the cases of those individuals who have normal maxillary and mandibular development, whose arches are practically normal, and whose general features are regular. In this class you will often find plenty of arch space, or bone alveolar development, to accommodate easily fourteen teeth in each arch; but through arrested development of the bony structure in the angle of the ramus and the posterior part of the alveolar process, there is not sufficient space for the third molars. The result is that these third molar buds develop at an angle of approximately forty-five degrees, with the roots reaching down toward the adverse portion of the heel of the ramus, the cusps being pushed forward mesially and lingually, striking,

and in a great many cases exerting pressure against the distal side of the second molar just below the enamel line of the tooth.

"I have noticed this pressure against the membrane surrounding the second molar in case after case. As a consequence, the second molar is moved heavily to the lingual, and often with considerable rotation on the tooth's axis. Every competent orthodontist, attempting to straighten up these second molars with their heavy lingual inclination, can have adequate proof that they have been moved to that position by the action of the impacted third molars, by a study of radiograms taken from three angles. We have found that this second molar in the mandibular arch almost defies any amount of pressure that it is possible to place there to restore it to its normal position and maintain it securely, as long as the action of the third molar is allowed to remain.

"After carefully studying the cases I have had under observation, and working with some prominent exodontists along this line, it is my belief that in cases of this type it is better to remove the second molar and allow the third to move forward and erupt in a normal position, rather than to attempt the blocking and surgical removal of the impacted third molar, with the detrimental action that is likely to follow that procedure. We all know that in many mandibular cases the roots of the developing impacted tooth are around the heavy inferior dental nerve, coming down within the angle of the ramus, and that it is also possible through the amount of the process necessary to be removed to so weaken the bony structure that a fracture of the jaw may occur at that angle.

"The question has been asked me a great many times whether the erupting third molar in this case would erupt in a manner that would establish occlusion or contact with the first molar. I have carefully followed out a number of cases, and in every instance observed the third molars have moved out to an ideal occlusion. The cases studied have been individuals between the ages of 16 and 24. It is not my contention that all second molars should be extracted where there are impacted thirds; but in the type of case described it is my judgment that it is better to remove the second molar than to surgically remove the impacted third, with the possibility of injury to the bony parts.

"With this same type of case, in dealing with the maxillary arch, you can prove to your own satisfaction through careful use of radiograms, that in over 70 per cent of the cases the impacted third molar is almost on a line with the first molar, taking the mesial portion of the impacted third and the distal portion of the first; because in such cases the action of the third molar is from the lingual angle of the alveolar process, with the exerting pressure on the distal lingual angle of the second molar, shoving the teeth to the buccal—so much so that I have sometimes seen the occlusal surface of the second molar at right angles to the cheek tissues. Where this condition exists, it is a simple process to remove the second molar and allow the developing third molar to erupt almost straight down, and establish contact with the first molar.

"The second classification of malocclusion deals with what are commonly called Class II or distocclusion cases. Here we find underdevelopment of the mandibular arch, so that it is perfectly obvious that there is not enough al-

veolar process to take care of sixteen teeth. If such a case be taken at the ideal period for bone development, and granted that the systemic conditions are favorable, it would be possible to gain sufficient bone development in the mandibular arch to accommodate the first and second molars, and in a small percentage of cases enough development has been gained for the third molars. It has been my observation, however, that in at least 30 per cent of such cases it would be far better, where the radiograms show a developing third molar without sufficient process to accommodate it, to remove the second molar and permit the third to erupt in the second position.

"As we know, in gaining our bone development in the mandibular arch with the use of the intermaxillary ligatures, the teeth in the maxillary arch are moved slightly to the distal, and the pressure exerted in an anterior manner in the mandibular arch. For that reason, if the third molars in the maxillary arch have not sufficient space at the time the case is started, it is perfectly obvious that there would not be room enough later when the pressure is of a posterior nature, and the development is merely that of buccal expansion. Therefore in such cases I think it is much better to remove the second molar and allow the third to come into place.

"The reason for so many failures in Class II cases has been that we have blindly attempted to retain sixteen normal size teeth that were intended for an individual with normal facial outline and bone development. How many times have we seen cases where the individual had a small narrow face, and the orthodontist in making correction has kept the sixteen perfectly normal teeth and developed the arches to accommodate them. The resulting occlusion may be ideal so far as the teeth and the processes are concerned, but when taken in relationship with the rest of the face it gives an unnatural and ape-like appearance. We should always take into consideration the facial outline and type before drawing our conclusions as to whether it is best to maintain the arch in relationship to the rest of the face, rather than to attempt to establish an ideal where it would draw the arches out of proportion.

"The third classification covers those cases commonly known as Class III, or mesioclusion, where we have a normal or overdeveloped mandible, and underdevelopment of the maxillary arch. This type is one of the easiest of all classes to handle and correct, from the standpoint of the orthodontist. As a rule there is less trouble here with impacted third molars on account of the greater development of the mandible, which allows space for them to erupt properly.

"Now in this type of case, where the conditions are as described, and where development is to be gained especially in the maxillary arch, particularly in the anterior portion from canine to canine—for here the maxillary wings have failed to unite with the nasal spine and form a normal maxillary arch—we find less trouble with our third molars than in any other class. But where we find that through our corrective action on the anterior portion of the maxillary arch we are moving the teeth distally on the mandibular arch and bringing about an impaction of the third molar, it is better to remove the second molar and permit the third to erupt normally.

"In considering natural limitations, too many of us are prone to make the mistake of not properly diagnosing the cases of malocclusion that are pre-

sented to us, and taking for granted that we can make any change that we desire in the arches, irrespective of the racial type classifications. In other words, we have felt that it was in our power to lengthen the mandible to any length we might desire, and we deemed it entirely possible to put a Racial Type C mandible on a Racial Type A individual—or the same with the maxillary arch, with the corresponding development of the bones of the face. However, such is not the case, for nature has wisely provided a limit beyond which it is impossible, under normal circumstances, to get development. That is why, in certain types of cases, we find ourselves blocked absolutely in the effort to get mandibular development for the type of chin we deemed desirable. This is known as the law of natural limitations, and the only exceptions to it are where we have an over-secretion of the glands which have to do with the development of bony structure, and that is not normal development.”

The slides which have been shown of Dr. Potter's cases are of simple cases, and I am convinced, as a result of some experience and changed beliefs, that the extraction of second molars in cases where the first molars are sound and in good health puts a definite stop to lapsing of the treatment of the teeth anterior to the second molar, particularly so in his Racial Type A and Angle Class I and Class II, Division 2. I am also of opinion that the same holds good in his Racial Type B and Angle Class II, Division 1, if treatment is commenced at the age of eight or nine years. If treatment is started later, and the first upper bicuspids are removed in Angle Class II, Division 1, and Racial Type B, excellent results will be obtained without relapse for some time in some cases and permanently so in others. In like manner the extraction of four premolars at an early age of a large number of Racial Type A, Angle Class II, Division 2, will produce a result which does not lapse. This is one of the most certain nonlappers in existence—he is our trump card!

A great deal of light will be thrown on this interesting search for a remedy for lapsing of cases by making a study of a few models of cases which have never been treated but have been watched and observed from time to time.

I think we ought to place on record some words of appreciation of the work which has been done by some of our eminent friends abroad, who have tried and are trying to find a remedy for lapsing of treated cases in other ways than by extraction; I refer to the work of Dr. Rogers who was with us this summer. You will remember that he told us he *hoped* his efforts would, in years to come, lead us into a field of success. Gnathostatics and the works of Stanton, Simon and Schwarz have, I believe, a similar hope, but up to the present I do not think any of these gentlemen is prepared to say that if you do this or that you will not have a relapse, but I do believe that, sooner or later, they will tell us that by the adoption of their teaching we shall know which are the teeth most suited for removal, in the cases in which extraction is advisable, and that this or that case needs no extraction. We look forward to the day when these gentlemen will have succeeded thus far. It is impossible in one paper on an important controversial topic to do any more than touch the fringe of the subject; there is a host of side issues which would have to be considered before the subject can be fully embraced and dealt with.

I believe it to be within the bounds of feasibility to boil this subject of treatment of cases of malocclusion down to one of comparative simplicity, and that the adoption of the principles and ideas can be understood, appreciated and practiced by a large number of general practitioner orthodontic students with great success; this is the crying need of the general practitioner students of orthodontics today in England. We need a middle course, based on a definite plan, for definite reasons, to achieve a definite result. The indiscriminate extraction of teeth without a plan of treatment based on reasoned ground does as much harm in some cases, and possibly more, than treatment without extraction ending in a relapse. If a few cases have been successful through a chance extraction in the direction of least resistance and the easiest way home, it does not follow that extremist or chance work is worthy of imitation as a general rule of procedure.

CONCLUSION

I have tried in this paper to make an effort toward the solution of the lapsing problem, and it can only be considered as a first effort or start. I felt I ought to try to make this effort, as I have done some writing and lots of shouting about lapsing, and you will naturally think and wonder what I am going to do about it, and whether I shall leave it there and run away; as a matter of choice I am prepared to fight it out until some solution is apparent.

The strain of a busy general practice without touching orthodontics is a big one; with orthodontics thrown in it becomes a still greater one. I am convinced that a whole-time devotion of six months' investigation into this subject can produce a simple reasoned presentation of diagnosis and treatment with a Racial Type classification in conjunction with a classification of malocclusion which will embrace most of the cases which come into our hands for treatment, and give us results that we can look on with pride. It can be made simple, comprehensive and effective in procedure. The application of appliance principles and technique at our disposal today are ample for the successful carrying out of the work which will be necessary to put our plans into operation. The idea and the policy I have laid before you are worthy of hard work and support, and I trust and hope that the day is not far off when we can face this problem in a very different way from that in which we have faced it in past years.

I have only touched on a very small part of international orthodontic study in the paper. A careful perusal over many years' history will, I am sure, add many more ideas than I have suggested. We will find something in most orthodontic works which will help us, but it is impossible for one who is busy all the time with matters other than actual practice to do the justice to our predecessors' works which they are entitled to.

I am most grateful to you for the honor and opportunity your secretary has given me in asking me to appear before you, and I would ask you to accept this paper as a sincere and honest effort of one of your members on a subject which he feels is at the very root of successful orthodontic work in a general practice of dentistry.

DISCUSSION

The *President* said that Mr. Lockett, as usual, had given a most interesting communication. The question of the lapsing of treated cases had been with the profession since the earliest days in this branch of our work. All had been surprised at the result of extraction, particularly of the six-year-old molars in hospital cases, at the extraordinary results which had been obtained without any treatment. Also they were faced with the difficulty of the impaction of the third molar. It had often been a problem with himself after treating a case to see years later the third molar very badly impacted.

Mr. H. C. Visick said that Mr. Lockett was to be congratulated on having brought before the Society in such a clear way some rather drastic proposals. It took a man of some courage to suggest extracting teeth in such a manner. To have a generally accepted plan for the treatment of orthodontic cases which every general practitioner could adopt would be a splendid idea, but personally he would like to meet the man who was going to draw it up. He would be very pleased to see the plan when it was on paper. It would have to be only tentative because conditions were changing all the time. Appliances were continually being improved, which made a tremendous difference. In the old days cases could not be treated as they could be today; modern materials and appliances were so much stronger and neater. With regard to the extraction of second molars, it seemed to him to be an extraordinary suggestion. He did not know whether he was imagining it, but he had always thought that the second molar was the best of the molar teeth. The first molars were more often carious than the second molars, and the maxillary wisdom teeth especially were very feeble sort of teeth. They seemed to get caries all over them. It struck him that in many cases a practitioner might extract the second molar and find himself left with a very poor wisdom tooth, the result being that he had practically only the six-year-old molar—one molar—on each side of the jaw. Were wisdom teeth good material? His impression was that they were not. He could not see why the second molar should be interfered with. If overcrowding makes extraction necessary, why not select the first maxillary premolar, a much better tooth to take out? It is not so important from the masticating point of view and it is nearer the site of overcrowding. If the second molars were extracted, a lot of orthodontic treatment would be necessary to move back the six-year-old molars and the premolars before room could be made for the anterior teeth. Mr. Lockett had mentioned in Angle's Class II, Division 2 cases that it might be advisable to extract all four premolars. Personally he must say that from his experience he thought that that was absolutely wrong. If one had a Class II case of any kind one only wanted the maxillary premolars out, because the whole mandible was too far back in relation to the maxilla. If one extracted the maxillary and mandibular, one had exactly the same relationship, only the jaws were a little smaller. Personally he would say extract the maxillary premolars, and never extract all four.

Mr. C. S. Morris supported Mr. Visick in what he had said about extracting first premolars. He thoroughly disagreed with Mr. Lockett. He thought one would end up with the same relation of the jaws as one started with—one pace to the rear. Another thing he would like to say with regard to extracting maxillary premolars was that if one found oneself too short, with the maxillary incisors not back against the second premolars, and one wanted to shorten the mandibular arch, one had only to take out the mandibular central and it worked like a charm. He considered Mr. Lockett's paper was an extraordinarily good contribution to the subject of relapsing. Personally he had never thought of taking out a second molar. Mr. Lockett had certainly given the members a tremendous amount to think about, and practitioners might be on the track of stabilizing some of their disastrous cases instead of having to go through all the trials that they did when they saw the cases five, six or seven years after they had been finished, when they had looked to be extremely attractive cases. He would like to hear what other members had to say about such a novel proceeding as that put forward by Mr. Lockett.

Mr. H. G. Watkins said a great deal depended on the amount of overbite. If there was too much overbite of the incisors and one removed some of the occlusal surfaces one

would probably make the overbite worse. If there was not much overbite then one could get the maxillary incisors back by extracting the first premolars. With regard to lapses, when there was an anterior crowding of teeth, it was most likely caused by the balance of the forces of the cheeks and the lips being opposed to the tongue. If the tongue was abnormally small, and one did not reduce the number of bricks in the arch but just got them to normal occlusion and after a time removed all the appliances, something would happen if the lips were going to press more strongly outside than inside. If one had already removed two or four teeth there was more chance of the teeth in each arch remaining in a state of equilibrium between the pressure of a small tongue and the cheeks outside.

Mr. J. H. Badcock said he confessed that when he had heard Mr. Lockett suggest the extraction of four premolars in Class II, Division 2, he thought it had been a slip of the tongue, and he was very desirous of hearing Mr. Lockett's explanation in defense of that proceeding. He had thought that Mr. Lockett had meant Class I. It seemed to him that it was a proposition which it was rather difficult to defend. With regard to the extraction of second molars, it seemed to him that there, as in other cases, one had to be guided by circumstances. He took it that one would first ascertain by means of radiograms whether the wisdom teeth were of normal size and likely to come into normal position. If they were not, it seemed to him that the second molar, being, as Mr. Visick had said, an exceedingly valuable tooth, should be retained, and should only be extracted when absolutely necessary. He had had a case a little while before where the second molars were impacted against the first molars, and the wisdom teeth were impacted against the second molars. In his anxiety to save the second molar he extracted the unerupted third molars, hoping that the second molars would fall back a little, and so come into proper position. They had not done so, and had shown no sign of doing so. They still remained impacted, and he thought he would have done better in that case had he extracted the second molars instead of the third, and so avoided a very difficult operation, and possibly achieved a better result.

Mr. W. A. Bulleid said there was one aspect of Mr. Lockett's paper to which he desired to draw attention. Dr. Potter's classification was based on what he was pleased to call racial types. Personally it seemed to him that that was a very dangerous and a very difficult way of classifying either people or cases. In any case it certainly was not of universal application. Dr. Potter was an American, and in America there was a mixture of different races. America was a melting pot of races; there were there the Slavonic element, the Italian element, and the Scandinavian element. Those were more or less distinct races, and in the United States they blended and there were mixtures of them. Therefore there might be some grounds for Dr. Potter classifying American people according to types or mixtures of types; but, for the life of him, he could not see that such a classification could be of any value in a country like this, for, although we were an enormously mixed race, the mixture had gone on for so long that any real classification according to racial types was a practical impossibility in this country. As a matter of fact, in his own mind he regarded with a good deal of scepticism the question of racial types and their mixtures. He was inclined to think that relapses occurred in cases where the etiology factor of malocclusion was an hereditary one, and that in cases where the deformity was due to a local cause one did not get any relapse. There was one thing about Mr. Lockett: he was a thorough-going pessimist! Was the reputation of orthodontics in this country—that most cases relapsed—true? Personally he did not think it was. A great number relapsed, but the majority did not; and the drastic method which Mr. Lockett suggested as one of universal application was, in his own opinion, one to be condemned out and out.

Mr. H. Chapman remarked that the question of extraction was one of the utmost importance in the work of a practitioner. He agreed with previous speakers that if it could be applied in the right place at the right time it would help retention very considerably, but the difficulty seemed to be to decide which was the right place and what was the right time in which to do such things. Previous speakers had said that if there was to be a

general rule it should be the first premolars; and he agreed with that for reasons which had already been given, namely, that the first premolar came as near the center of the two halves—or each half, he should say—of the arch; that was to say, it was about the center of where the errors were. Therefore he did not think a better tooth could be chosen for removal, if there were any removal at all. He desired to ask Mr. Lockett if the members were to assume that if the second molars were to be removed, were they to delay their treatment until 12 years of age or approximately to the time when those teeth erupted? Personally he had advocated for a long time that treatment should be early. He had not heard anything in the paper which would convince him that that was wrong, and if that was so it seemed to him that it must also be wrong to remove the second molars, apart from the reasons which had already been stated. In his own experience there were certain cases in which the removal of premolars was absolutely indicated. He had attempted to retain all the teeth and, having failed, had had to fall back upon the extraction of two maxillary premolars; and it seemed to him that there were certain types of cases in which that was the correct treatment. Again, cases were seen in which mandibular incisors had been removed, and he had one at present. Two mandibular incisors had been removed, and that case had given him more anxiety than any other. If he were to take off the appliances now the result would be that the arch would contract even more; the two incisors which were left would crowd still further. He also remembered showing a case before the Society where he had removed a mandibular central in order to let in a lateral, and that case had collapsed too. Therefore he did feel that experience of a large number of cases was wanted in order to learn how they behaved when teeth were removed. Mr. Lockett had ventilated a very important matter. What was required was that a number of cases should be brought before the Society showing the result in the different circumstances so that the members could gain experience in that way. He did not think anything was to be gained by stereotyped treatment such as Mr. Lockett suggested. It seemed to him that each case or type of case was a law unto itself.

Mr. A. C. Lockett, in reply, said he desired to repeat what he had stated in the paper, namely, that the subject was too big a one to be covered by one address in one evening. He also desired to emphasize the point that the extraction of the second molar was Dr. Potter's idea and not his own. Dr. Potter had taken up a definite line of work on those lines, and proposed to carry it on for the simple reason that he was convinced—and on that matter he (Mr. Lockett) was in agreement with him—that the lapsing period started on the arrival of the second molar. If these cases were retained during that period, and a little beyond it, then the lapsing period would commence, in certain types of cases, on the arrival of the third molar after the removal of the retainers. Dr. Potter's idea was that it was much better to go right to the root of the matter—that if it were possible, to remove the third molar—then there would not be a tendency to lapse when the second molar started to erupt. The idea of taking out a second molar, which was about the soundest tooth in the denture as a general rule, was a terrible thought, even where there was a tendency to caries. He had not advocated it himself, except to the extent of searching for some remedy. If anyone could suggest any other means whereby the problem could be solved, other than by extraction, he would be only too pleased. From experience he did know that there were certain types of cases which did not lapse under any circumstances whatever, and that one could treat them without any extraction, but they were very few and far between. There were less of them in England than anywhere else as far as he knew. Mr. Visick had stated that it was a drastic idea, and he agreed. With regard to the plan of classification, he knew it would be very difficult to formulate a plan or a classification of certain types of cases which would in every event prove successful, but even as a tentative and experimental beginning it might prove useful. The great difficulty about our work was that one had to spend the best part of one's life in either proving or disproving something. Such an experiment would take three or four years before one could begin to call it the commencement of an experiment. In reply to Mr. Visick he had also stated in his paper that he believed there were many cases where the first premolar, if extraction were resorted to, was preferable. Some

members had been horrified at what he had said about extracting four premolars in Class II, Division 2 cases. He had the greatest respect for the opinion of those members, but he had seen many cases where those four premolars had been taken out in Class II, Division 2 cases with perfect results, as far as the occlusion of the remaining teeth was concerned, but in these cases there was not an excessive overbite. There was a tremendous amount of room for thought in regard to the matter, and he realized it was a serious question to put before such a distinguished Society, but to those of us interested in permanent results, well worthy of our careful consideration, he was not sure that he quite agreed with Mr. Bulleid that the classification of types of different people and races was dangerous and impossible. Mr. Bulleid had described him as a throughgoing pessimist. On the contrary, he was a most cheerful person, as a rule, in all matters which he came up against. He did not know that any pessimist would tackle this problem as he had done if he were not convinced that the matter could be put right.

THE RÔLE OF NOSE AND THROAT DISEASE IN THE PRODUCTION OF DEFORMITIES OF THE JAWS*

BY DR. A. LOWNDES YATES, ENGLAND

I MUST admit that until some five years ago I had taken little interest in the important question of orthodontics. About that time a schoolmaster called on me with a view to obtaining information as to what could be done to remedy the adenoid faces of several children in his class. I had to admit that I knew nothing of the matter, and so I searched the literature for information on the point, but I found no record of any attempt at cure of this condition other than removal of the adenoids and tonsils. It was, however, clear from my own experience and that of school-teachers that the removal of the adenoids, although it doubtless checked the progress of the facial deformity, did very little to remedy the abnormalities which were already present in the jaws and other facial bones. I therefore decided to investigate the question for myself, and as a result I have to put before you certain facts which are, at the present time, only partly proved and certain data for your consideration. I must apologize for bringing to your notice a research in an unfinished state, but to fully prove the facts will take so long that it is wise at this stage to have the criticism of experts on the validity of the views which I am holding.

As a preliminary I examined 130 cases of children with deformity of the jaws; in three of these the deformity was unilateral or affected one side more than the other. In 127 the deformity was equal on the two sides. In the three unilateral cases examination proved that there was a chronic maxillary sinusitis on the side which showed deformity, and this was confirmed by washing out a quantity of pus from the antrum. I propose to bring to your notice arguments in favor of the consideration that it is the presence of the inflammation in the antrum which gives rise to overgrowth in the superior maxilla as a whole. If this is so, a double maxillary sinusitis would cause an overgrowth of both sides of the jaw.

Of the 127 cases in which deformity was bilateral, six showed deformity of the superior maxilla only, and in these there was maxillary sinusitis; 121 showed deformity of all the facial bones in which the maxilla and mandible both shared. In this group there was a curious feature, for, whereas the superior alveolus was longer and narrower than the normal, and the palate more arched than usual, the mandible suffered from the opposite defect, being shorter than the normal.

In the maxilla the deformity affected almost entirely the portion bearing the four incisor teeth, thus differing from the group with sinusitis in which the deformity occurred mainly in the portion occupied by the molar teeth.

*Transactions of British Society for Study of Orthodontics, Feb., 1928.

In this type of case in which deformity is met with in all the cranial bones and the abnormal growth of the jaw is but a part of this, the alteration in the head bones is a prominent feature. The summit of the head is small, because the forehead slopes backward, and this slope is also represented in the facial bones, the prominence of the maxilla and malar bones being largely conspicuous by their absence. The back of the head tends to be angulated.

It is clear that in this type of case there is a universal change in all the skeleton, for, if we photograph the child without its clothes, we find an abnormality of the back in nearly every case. Now in this type of case the facial deformity is known as the adenoid face, but though adenoids are found in the majority of cases, their presence is not essential to the deformity. Diagrammatically we may represent the deformity as follows:

We may at this stage digress for a moment to consider certain data connected with the development of the jaws and the growth of the cranial bones in the child and in youth.

Professor Brash, whose great assistance I wish to acknowledge gratefully, in the earlier stages of this work has cleared up many problems in the growth of the jaws in young quadrupeds by the madder feeding method.

The age of five is critical in the growth of children's jaws and in the development of the facial bones.

Between the ages of five and six years, as is well known, vast changes in both jaws begin and are completed when the last molar tooth is cut. In the maxilla the passage of the permanent teeth into their final position occurs at definite periods in life, but what is not appreciated possibly so well is that the antrum enlarges just as definitely, for the changes in the jaw which lead to the passage of the teeth into their adult situation also lead to an enlargement of the antrum, which is quite small at the age of five, holds about five minims at the age of one, fifteen minims at the age of five, and 250 minims in the adult.

From a consideration of pathology we know that inflammation due to certain types of organisms produces thickening of bone. In the antrum I find that the *Staphylococcus aureus* does this and the streptococcus, pneumococcus and Friedlander's bacillus apparently have no such action if in pure culture.

It is therefore not unreasonable to expect that chronic inflammation by the *Staphylococcus aureus* would result in irregularity of the teeth by reason of such thickening of bone, and such is actually found in many chronic cases.

The question will arise as to how the antrum gets infected, and for this I must make reference to another investigation which I have carried out in respect to inflammation in the nasal passages of children, a condition which I call rhinitis infantorum. This state is met with in children in their mother's arms. Cases come into hospital for bronchitis, as a result of this rhinitis, and get well quickly, but the condition soon recurs when they return into the keeping of their mothers. This recurrence of inflammation at home and cure in hospital goes on until some one examines the mother's mouth and treats the pyorrhea from which she suffers and from which the child gets its rhinitis. The purulent secretion in the mother's gums is always dry and of a special

type which naturally I do not understand, but all my colleagues are agreed as to the presence of the condition and the importance of dental treatment of the mother in these cases.

One reason for the importance of this condition is that the type of nasal sepsis so produced in the child is rather chronic and that if it persists up to the age of five there are reasons why it will affect the growth of the maxilla. These reasons are connected with the changes in the facial bones which begin at the age of five, and to which I have already made some reference. At this age the frontal sinus begins to develop. The antrum begins to enlarge with great rapidity, and the ethmoid and sphenoid sinuses take on a rapid growth. Nor are these changes without their object, for on investigating them I found that the mechanism of dust removal in the child is carried on largely by the nasopharynx, and that the pad of adenoids is evidently designed to deal with the infective products that the mucous membrane covering them extracts from the inspired air. The antrum and the ethmoids in development push the dust-removing organisms of the nose, namely, the middle and inferior turbinates, before them into the nasal airway; and gradually the nose replaces the infantile nasopharyngeal mechanism as a dust and germ remover from the inspired air.

The importance from the dental point of view is, that if the child's nose is infected from its mother's teeth, this development of the sinuses is delayed, so that they retain the form of infancy far longer than in the normal child.

If when you have investigated this, you agree, we should make a combined attack upon the social problems which this factor introduces.

The nasal sepsis has one further action of importance from the orthodontic point of view, for rickets is found associated with the sepsis and is not readily cured until the sepsis has been remedied.

Dealing with the jaws from the standpoint of physics, we find that the deformity of which I have already given some account results from altered posture. This posture may be described in the term "poking of the head." The cervical vertebrae are thrust forward and the head extended, with the result that there is a definite pull of muscle upon the mandible which thus is shortened. Evidence that this is so is to be found in the fact that, when the four mandibular incisor teeth lie below the level of the canine and premolars as in one form of open-bite, that this occurs exactly opposite the insertion of the hyoglossus muscle.

The facial and maxillary deformities are dependent apparently on the altered position of the head. Why this is so is not quite easy to explain, but that it is a fact can be adduced by the analogy of the growth of the facial bones in congenital torticollis. Here the head is held aslant, but the line joining the orbits is horizontal as is also that joining each alveolar margin. The abnormal growth in the deformity which we are considering is apparently a similar effect of posture.

I do not wish to give the impression that nasal sepsis or adenoids are in my opinion responsible for more than a small majority of the cases of deformity of the jaws with which we meet. I thought at first that unilateral enlargement of the maxilla was always due to maxillary sinusitis. Investiga-

tion taught me that this was wrong, and that apart from abnormalities such as odontomes, and the like, unilateral deformity of the jaw occurs in every well-marked and long-standing case of scoliosis in the upper dorsal region.

So with the deformity with which adenoids are associated commonly, the same deformity may be found in cases where poking of the head is due to visual defects, particularly short sight. It may be found in other conditions also, but I have said enough to introduce the question of posture and the growth of the jaws to your consideration.

There are other facts which, perhaps, it will be well to consider. First is the question of the position of the plummet line. In the normal this plummet line falls from the external auditory meatus and appears to pass through the bodies of the cervical vertebrae. It then should pass from the tip of the acromion process. The lumbar spine should be two inches closer to it than the mid-dorsal in the full-grown person. It passes through the center of the great trochanter and therefore behind the center of the acetabulum, thence to the knee where it passes just in front of the center of the knee joint and thence to a point midway between the head of the astragalus and the anterior margin of the external malleolus. The position of the plummet line is markedly altered in these cases. The normal line, which I have just described, varies considerably in the healthy adult and the child, and it is difficult to say exactly when abnormality begins. Another point, possibly of importance, is that in children with the type of the deformity which we are discussing the postural reflexes are very often sluggish and the child is clumsy and tends to have poor power of equilibration. Since "Magnus of Utrecht" described the postural reflexes and neck reflexes in quadrupeds there has been little work published on this question. The postural reflexes in the human being differ materially from those of quadrupeds, owing to the adoption of the erect position. Roughly these reflexes may be summarized as being an automatic movement of the head which aims at restoration of equilibrium of the balance if and when this is temporarily unstable. A push upon the shoulders in a forward direction results in health in a backward movement of the head which action as a counterbalance restores the equilibrium. The same effect is produced by a forward movement of the head, and the child moves in a direction backward. Sideway movements are only present when standing on one foot. This altered posture which we see in children is accompanied by sluggishness of these reflexes which do not reappear at their full speed until the deformity in the cervical region has been remedied. It will be remembered that these reflexes are absent in cases with a well-marked postencephalitic state, and it will also be remembered how much certain Parkinsonian postencephalitics resemble children who have adenoids.

CONCLUSIONS

From the above consideration, although the research is in such an unfinished state, we are perhaps in a position to draw certain provisional conclusions. The first of these is that deformity of the maxilla may result from chronic sepsis in the antrum which causes overgrowth of bone; the second, that the nasal sepsis often has its origin in the mother's septic teeth while

the infant is in arms, and that this nasal sepsis if untreated may be retained within the sinuses for years and lead to deformity of the jaws when these begin their second period of development. The third conclusion is that posture has some effect upon the second period of development of the jaw and that it is possibly wise to treat all deformities of posture in cases of deformity of the jaws. This can be done by means of exercises, but at present there is a difficulty in making the child do these, for mothers nowadays expect the school authorities to take the sole charge of their children's health, and the school authorities are not, in actual fact, responsible for treatment of the children, although they are responsible for telling them to get the treatment if available.

I should like to point out that the trend of this opinion is that postural treatment cannot replace the orthodontic, which will still be necessary; but I do think that with postural treatment in addition, and with treatment of the sinuses in carefully selected cases, that it may be easier to get first-class results in orthodontics than is possible at present.

DISCUSSION

Mr. G. H. Northcroft said that this paper, in one aspect, bore out some of the work that had been done in America on posture, although there, postural positions were studied from a rather different point of view. With regard to what the author had said about the effect of infection from mothers to infants, he (the speaker) would like to point out that in cases where the parents were not septic and had not got pyorrhea the children still suffered from what was called postnormal occlusion with narrow arches. Was it wise to lay so much stress on the oral sepsis of the mother as the factor giving rise to rhinitis and hence to the malformation of the jaws in the child? He was not arguing that this did not cause malformation of the jaws in some cases—the particular cases mentioned by the author—but one must not argue from the particular to the general. It was found often that the incidence of irregularities started very early in life—far earlier than the age of five—and therefore it was not always necessary to put down the malformations which were seen as being due to the development or nondevelopment of the antrum, whether that was actually stimulated to develop by infection or not.

Mr. Cale Matthews said that he was grateful to the author for having brought forward a subject with which practicing orthodontists were not familiar. For example, they could not see what he would like to describe as the developing of the internal face from 5 years onward when the sinuses were so rapidly growing. That was a new phase, in both its pathologic and normal relations, that the author had placed before them. The unilateral palatal abnormality was practically constant in every form of malocclusion, and when Professor Brash was preparing his paper for that Society—and incidentally in connection with his general research work on the growth of bone—the speaker supplied him with a number of sections of palates, and he had noticed, taking a mental picture of the vault before the impression was poured, that the great majority of malocclusions of every type showed an abnormality, generally unilateral, in the vault of the palate. Whether or not this was due to overgrowth of the antrum from some pathologic cause, it was very interesting. He had been a little disappointed owing to one omission from the paper. Posture was consequent possibly on many causes. The result of a certain type of posture, the forward position, might affect the development of the head bones and consequently of the teeth and their arches, but it had another effect, which he thought was almost constant, in the production of vocal tone. It was very rarely that one found anyone without a good posture who had a good resonant vocal tone. Vocal tone usually came, particularly among the great singers, from a big broad arch, possibly as much as from the ordinary voice box. This, perhaps, was a little apart from the subject, but it was important in the development of orthodontics. The

voice production by what was known at the present day as the Italian method was specially to be noticed among tenor singers, who modeled their methods on the great Caruso, one in many thousands both for quality and size of tone, a big forward tone, using the nasal sinuses. Unless the sinuses were clear and well developed, that tone could not be produced. There was another type of voice among some public singers, namely, the adenoid type. These people, he imagined, still had adenoids present or some obstruction, with the consequence that their tone was muffled. The cause of a forward posture might be in the cervical vertebrae, it might be in the lumbar vertebrae, or it might be the late development of the great muscular system of the chest and back. He thought that the type of child illustrated in the paper, once his adenoids and tonsils had been seen to, and his sinuses washed out, could be put on exercises which would produce a good resonant vocal tone, so that the child would not be left to wander through life slaughtering his words and having an enunciation difficult to be understood outside his own family. There was, as he was well aware, an unconscious imitation by the child of his parents. Only last week two children—sisters—were sent to him. The younger child was an appalling case of postnormal occlusion, but the mother who accompanied the children, showed a condition equally appalling, and he came to the conclusion that the kindest thing he could do was to advise that the child be sent away for a long period from her mother, because whatever was done for her otherwise was negated by the unconscious imitative character of the child. Orthodontists could not work independently of those who worked on adenoids and tonsils. The thousands of children who were treated annually for nose and throat disease were never seen in any hospital dealing with orthodontic treatment. There was everything to be gained by the cooperation of the workers in these two fields. An instance of cooperation was furnished now at Birmingham, where the school medical officer, Dr. Auden, was sending along children suffering from postencephalitis lethargica for impressions and observation in regard to their dental development.

Mr. Watkin wished to offer his thanks to Dr. Yates for his interesting paper, and to ask him to demonstrate on some one present the exercises which tended to correct this curvature of the spine.

The President pointed out that many of the models of maxillas exhibited by the author had high palatine vaults. In connection with this point it was interesting to recall that Professor Schaefer had said that his investigation, made in 1907, had shown him that the generalization often made, that narrow palatal arches invariably led to correspondingly narrow nasal floors, was not correct. Since that time observations have been frequently made by others bearing out the truth of his statement. The study of a large number of specimens showed him that the width of the floor of the nasal fossae was, however, dependent more upon the size of the maxillary sinus than upon the arching of the palate.

Mr. J. G. Turner said that, if time permitted, he would like to argue with the author. He would like to suggest, first, that the children whose cases the author had brought forward were hardly normal. There was a great deal more wrong with them than deformities of the jaws or adenoids. As for spinal curvatures, there were people with jaw deformities and absolutely normal curves, but beyond this, where was the line to be drawn as between normal and abnormal so far as these spinal curvatures were concerned? He was not very much impressed by the evidence so far as compensatory curves were concerned. The idea that did impress him greatly was that of the possible overgrowth in connection with staphylococcal infection, and he thought there was a possibility that a low-grade infection might induce actual hypertrophy of the tissues in contact with that infection. Some of the considerations put forward by the author in connection with growth were well worth pondering. It seemed to him the most reasonable view, although there were points which seemed in contradiction to it, that adenoids and the consequent obstruction were the cause of local failure of growth, and that all the rest followed from this. This used to be put forward in explanation of the weakness of the muscles as well as of the intellect and of other troubles. He was interested in the point about oral sepsis in the mother. He had tried to insist that all people with oral sepsis were carriers of disease and disseminated it to others. That the early appearance of maxillary sinus suppuration might be due to the mother was quite a useful point. He wished to know whether the author was sure of his measurements of the antrum at the age

of five. His own experience on looking at the x-rays of skulls was that many children, before the age of five, had an antrum which would hold more than a drachm of fluid.

Dr. Yates, in replying on the discussion, said that he quite agreed with the point made by *Mr. Northcroft* with regard to the cause of malformation of the jaws, and the photograph of one of the children he had brought forward bore it out. *Mr. Cale Matthews* had pointed out to him a number of omissions from his paper. One was rather groping in the dark with regard to these matters. The other side of a particular case—that is the side more particularly under the surveillance of the orthodontist—was not known to the man who was dealing with the throat or nose trouble. He was aware of the difficulties that might arise in voice production as a result of adenoids, and of the wonderful voices that might be got if the adenoids were removed at a certain age. With regard to the question as to whether the deformity of the body was the essential cause of the deformity of the jaw he thought that the balance of evidence was strongly in favor of this view, but one of the difficulties which arose here, as in other particular cases, was that of defining the line between the normal and the abnormal. He did not think that except under special circumstances, adenoids should be removed under the age of five. They always grew again if so removed, but if removed after the age of five they did not recur. It was very probable that nature required them before this age and after about this period had done with them. Before the age of five they should, he thought, only be removed in those cases in which sleep was being interfered with and so forth. His personal feeling was that there was very little obstruction to the nasal airway as a result of adenoids. The obstruction was in the nasopharynx, and that only when the head was flexed. Such obstruction occurred only when the children were asleep at night. Such children were often alleged to have fits. The fact was that they were lying on their backs and the fit was caused by respiratory obstruction and to nothing else, and this in turn was caused by flexion of the head, which, when the deformity of the mandible resulting from the altered posture in the day was present together with obstruction of the nasopharynx by a pad of adenoids, caused a degree of asphyxia sufficient to wake the child up either with night terrors or with convulsions caused by the asphyxia. In such a case if the child was prevented from turning on its back during the time it slept, these symptoms always disappeared. This rather went to prove that the head was forced forward, that is to say extended by the adenoids because the normal position of the head resulted in respiratory obstruction when adenoids were present. With regard to the question as to whether dental sepsis was a source of air-borne infection to the community, colds could occasionally be traced to the bad teeth of an infection carrier. This occurred more commonly in closed rooms than in the open air, but occasionally a man with very septic teeth apparently caused people near him in a bus to catch a cold. The speaker mentioned the case of a man who, having very septic teeth, refused to have them dealt with although it was pointed out to him that he was damaging the health of those who worked with him, some of whom caught a cold which had an incubation period of one day, whenever they came into close contact with him. As to the size of the antrum at the age of five, he thought that it was very difficult to gauge this from an x-ray photograph. When an antrum at this age was injected through a cannula with a serum syringe, it held on the average 15 minims.

In conclusion; *Dr. Yates* demonstrated upon the President and others the exercises to which he had referred.

THE RELATION OF ORTHODONTICS TO GENERAL PRACTICE*

By B. MAXWELL STEPHENS, L.D.S., R.C.S., ENGLAND

I THANK you for the honor you have conferred upon me in electing me your President for this session. I will endeavor to merit the confidence which you have shown me.

There is nothing new under the sun, but circumstances alter cases, and as our circumstances are being gradually altered, I feel that it may be acceptable to you if I set to work and round up the relation of orthodontics to general practice, and mention some of its opportunities therein.

When I first joined this Society in 1911, three years after its foundation, it did not for a moment occur to me that it would one day fall to my lot to occupy the presidential chair. It was with me, as it has possibly been with many of my fellow members, the realization that I knew so little of the subject that led me to seek membership.

Circumstances have allowed some of us to enjoy the advantages of special training, while others like myself, have been forced, during the continuation of general practice, to pick up the crumbs which fall from the rich man's table. Did we but realize it our own table is often the richest, for it is usually by the observation of children in daily practice that we are first led to realize the deficiency of our hospital training in orthodontics; by it that our interest is quickened, and finally our enthusiasm created.

Our shortcomings having been revealed, it is natural that we should look round for a means of increasing our knowledge and improving our technic in the application of treatment. I do not know of any postgraduate courses held in England, but that supply will follow demand I am certain.

A means of direct study may present itself to some, but the papers read before this Society will always enable the student to keep in touch with the progress of orthodontics, and it is characteristic of the membership that information, if asked, is freely given.

Occasionally I have heard criticism leveled at the readers of papers to the effect that they have maintained their subject at too technical a level, but in spite of this, it must be admitted that it is unusual to leave this room without finding that light has been thrown into some corner of our clinical work.

At one of our meetings, Dr. Sim Wallace† drew attention to the fact that the Society was founded with the object of studying orthodontics and not with the object of teaching them. If, therefore, we are inclined to balk at part of a paper, it is well to bear this in mind.

*Transactions of British Society for the Study of Orthodontics.

†Proceedings of the British Society for the Study of Orthodontics, 1910, page 3.

I wish to impress upon the younger members the importance of getting into the habit of attending our meetings regularly. If this practice is established early, it will carry them time and again past that dangerous moment when, after a heavy day at the chair-side, they are inclined to give in, cut the meeting, and go home.

Now to mention one or two opportunities of enlightenment which occur regularly, though at longer intervals.

The European Orthodontological Society, of which many of us are already members, holds annual meetings in different cities of Europe. There is the annual reunion of the French Society of Dento-Facial Orthopaedics and, most important of all, perhaps, will be the recurrence quinquennially of the International Congress of Orthodontics, for this will serve to gather together enthusiasts of all nations at one time. The first meeting was held in New York in 1926.*

In my opinion the great value which attaches to these congresses and reunions is the individual contacts which are established and the personal conversations which ensue, accompanied often by valuable demonstrations. The acquaintances made and the friendships formed in other parts of the world continue to act as a *contra stimulus* to any insular tendencies which may possess us. In reading over papers and extraneous articles in magazines and books I have frequently found it valuable to have met the men who wrote them, for a knowledge of their personality has enabled me, the better, to gauge the truth and value of their writing.

With regard to orthodontics in this country, the profession as a whole roughly falls into three groups: The first consists of practitioners who acknowledge their shortcomings and would prefer to consult a specially skilled orthodontist. The second, which is rapidly diminishing, consists of those who don't care and plunge blindly onward. Unfortunately for their patients, their ignorance is rendered the more dangerous because they are unconscious of it. The third group is composed of those who endeavor to keep pace with the subject, and this Society is an outward and visible expression of their ambition.

Our founder, Mr. George Northroft, together with the original members, should feel satisfied with the result of their initiative when they observe the growth in the Society's membership.

There is no doubt that once interest has been aroused, orthodontics as a study proves most fascinating; when, however, the practical side is essayed and the application of treatment is begun, pitfalls are found. Should we then make a false step, it is in most cases because we have paid too little attention to the physiology and pathology of the parts with which we are dealing.

It must be admitted by most of us that we are mechanics at heart. The sight in the mouth of a particularly intricate and well-made machine has probably at some time or other provoked our admiration and sent us search-

*INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY AND RADIOGRAPHY, February, 1928. Dr. W. C. Fisher, *The Growth of Orthodontia*, "Not two years have elapsed since the Orthodontic Congress, yet there have come into existence the Chicago Orthodontic Society, the Virginia State Orthodontic Society, the Austrian Society, the Australian and New Zealand Societies."

ing trade journals for its supply house, resolved to employ the apparatus at the next opportunity. Later, however, we have learned that there is literally more in it than meets the eye, for it is not *what* is used, but *when* and *how* it is used that matters.

Earlier in this paper I made use of the words "a specially skilled orthodontist." In the fullest sense of the words, what is demanded of the man who shall attain this distinction? I mean one to whom those who have acquired the elements of the subject may go for further enlightenment as to details of treatment and the prognosis of a case; or for the diagnosis and treatment of a specially difficult or neglected case.

It is an apt remark that "a specialty should be built like a pyramid; the broader the base, the higher the apex."^{*}

What are the bases and general layout of the subjects which will give the knowledge requisite for this qualification?

It will be obvious to those who have become interested in orthodontics, that no one can perfect his technic and acquire the amount of knowledge I am indicating, without doing so at the expense of the rest of his work.

Dental surgery has spread itself over such a large area that it is only with the greatest difficulty that we can keep in touch with the general line of advance, and certainly we cannot do so simultaneously with all the outposts.

If we run over the subject headings of papers read before this Society alone, without considering those bearing directly upon technical points, we shall perceive the width of vision which is asked for: variation, heredity and genetics, embryology, morphology and anatomy, and anatomy associated with mechanism and growth of the face; comparative dental anatomy, ethnology and anthropology, rhinology and otolaryngology and dietetics and biochemistry as applied to the consideration of vitamins and the growth of bone cells. At the end of this session, too, a paper will be read on biology and its elementary principles as applied to orthodontics.

En passant, I have already alluded to the misfortune which follows the course of treatment which is based on an insufficient knowledge of physiology and pathology of the oral tissues.

If, in addition to a familiarity with these subjects, the individual can boast a long experience of general practice and a marked mechanical facility, he will discover that his interest and study have created for him a larger grasp of orthodontics than is possessed by his fellows, and he may decide to pass from general to special practice.

Further, if in addition to possessing a natural aptitude for dealing with children and their psychology, he possesses a sense of form, his qualification will be complete and he can be regarded as an "admirable Crichton" among orthodontists.

I have hinted at the desirability within the profession of orthodontic specialists, and the following analogy will point the arguments in favor of their existence. A library can serve most ordinary needs, but it cannot be said that it is complete without a section for reference.

^{*}A. W. Crosby in a discussion of "The Allurement of Specialisation" by Hoffman, J. Amer. Den. A., December, 1926, page 1799.

It is important for us to realize that a demand for specialists is arising from outside the profession. It is coming from our patients who, after all, are part of the public. Parents recognizing that a defect in the facial appearance of their child may be largely due to misplaced teeth will draw their dentist's attention, asking him what can be done. Sometimes they are told that it is too early for treatment, or that no treatment is possible; in that case they are liable to let the matter drift. But later, if they happen to meet a child in which a similar defect has been modified and the facial appearance thereby improved and by a different practitioner, an element of doubt as to the verdict of their own attendant may enter their minds, and in all probability they will approach him again. If his opinion is still that no treatment is advisable or perhaps possible, then the most natural course for them to take in their condition of doubt is to demand the opinion of a specialist. It must be admitted that in addition to the satisfaction it would bring to their minds, from our own point of view, the ethical handling of the case would be much simplified.

Having considered our circumstances at home, I will endeavor to indicate briefly the position of orthodontics in America—at least as I have observed them. That country is acknowledged to be the home of specialization and mechanicalization in general, and it is, therefore, not to be wondered at that orthodontics in particular should be evolved there in due course.

Possibly you are well acquainted with the history of its evolution? If you have succeeded in assimilating the whole of Weinberger's *History of Orthodontics* that will have brought you down to the year 1899. The work of many men is reviewed, but the facts concerning two particular personalities and their achievements cannot fail to stand out from the general mass of information given.

The first, Pierre Fauchard, on account of his book, *Le Chirurgien Dentiste*, which was first published in 1728, in which he alludes, even then, with illustrative cases to the value of what Walsh has termed "Timely Orthodontia."

The second outstanding personality is that of Dr. Angle who, by founding the first school of orthodontics in 1900, gave to his subject as a specialty the biggest push it had received up to then. In this act, and in having presented the first classification of dental irregularities, we must recognize the greatness of his qualities.

The momentum which it thus acquired has been maintained, until now, looking back over twenty-eight years, the rapidity of its growth can be estimated. Rapid growth, however, at all times is fraught with danger, and it was not long before various critics arose pointing out that the specialty, to speak metaphorically, was developing a likeness to the god of mechanics and, moreover, they claimed to discover cracks in the knees of the young Colossus. Their criticism in time drew together a body of men who, backed by experience and research, were able to substantiate their claims. They urged that a much greater width of vision could be arrived at by a closer and wider study of etiology and its allied subjects, and that mechanics would develop as a natural adjunct for the carrying out of treatment.

With the mechanical tendencies ever present, it will be understood that the existence of this group has not meant homogeneity in the profession, in fact some of the older school have been heard to declare that the condition of orthodontics in America is chaotic, but sound thinkers perceive that it is only a transitory state which is being passed through.

A few years ago, while an American Association meeting was in progress, a discussion arose as to the relative merits of a short or long course for graduates in orthodontics. Dr. William Fisher, whose sanity and judgment many of us came to appreciate while he presided over the 1926 International Congress, struck a sound note when he remarked, "I believe we are going to produce orthodontists tomorrow, just as we produced them yesterday, through individual effort, pure and simple. It has produced the great specialists in medicine for the last fifty years, and it will produce them in dentistry. A man can take a short course and get enough stimulus and sufficient knowledge therein to develop into a credit to his specialty, and others will fall by the wayside. Some of the best men that we have in our own specialty today never even had a short course."

In the history of medicine in Britain, Harvey, Jenner and, in our own day, the late James Mackenzie, are men whose achievements tend to prove the soundness of this hypothesis; Sir James Mackenzie particularly so, for by his efforts and ability, he graduated from the general to the special, and won for himself an international reputation as a heart specialist.

The mention of his name leads us to the consideration of the influence of general practice on the specialist. In the third chapter of his book, *The Future of Medicine*, published 1899, you may remember he says:*

"I am convinced that the conception of specialism dominant today is a wrong one, and that helpful as this specialism has been in many ways, nevertheless, instead of enlightening, it tends to darken understanding in a cloud of detail."

In specialism, where the ever present danger is that the part may shut out the whole, a long experience of general practice is the surest antidote.

I should not iterate the fact of experience in general practice being so important a preface to specialization in orthodontics, were it not that I wish to lay bare a small point which might otherwise be overlooked.

It is this—a specialist is called upon to say not only what will happen sequentially to a case if it is treated along certain lines, but also what will eventually be the condition of the case if no treatment at all is initiated. It is only after watching the development of actual cases for years, and studying serial models with their histories, that a true perspective of the value of treatment and the power to give a sound prognosis can be acquired.

Those who have succeeded, after years of graduateship, in developing wisdom and judgment, would like to see their successors start off in life with the result of their accrued experience added.

Though we honor ourselves by calling medicine a science, it is far from being a true science, and the bulk of the knowledge acquired in a life of gen-

**The Future of Medicine*, Sir James Mackenzie. Chapter III, page 44.

eral experience proves personal; it cannot be reduced to a system and set down in finality for others to assimilate, consequently, most of it dies with its possessor.

Mackenzie pictures disease as falling into four stages:*

1. The Predisposing.
2. The Early.
3. The Advanced.
4. The Postmortem.

He points out that owing to the urgent call to the profession for the relief of pain, we are led to commence our investigation of disease at the third stage, and then naturally progress to the fourth.

The backbone of Mackenzie's conception of investigation was that it should be commenced at the first or predisposing stage, and not at the third or advanced stage for, he says,† "disease is only made manifest to us by the symptoms it produces. That being so, in order to obtain a thorough understanding of it, we must recognize the symptoms, not merely by detecting their presence, but by understanding the mechanism of their production and their bearing on the future health of the patient.

"From that, it is self-evident that the individual conducting such an investigation should have the opportunity of seeing the disease in all its phases and of observing the symptoms it produces."

The general practitioner, however, is the only class of individual with the opportunity of acquiring this knowledge, and as the majority of us here are such, I will venture, among other things, to outline some of the opportunities which occur, of interfering in the early stages of malocclusion.

Mr. Northcroft said in his presidential address,‡ "Let me again appeal to you to take and preserve through a series of years the models of young and developing mouths, normal and abnormal." And again, in a paper read in 1907 before the Metropolitan Branch of the British Dental Association, he said that the lack of series of developing mouths was to be deplored, and that he had been amazed at the enormous number of abnormalities that were foreshadowed in the deciduous dentition before patients had reached the age of 5.

I was not yet (in 1911) aware of the existence of the British Society for the Study of Orthodontics, and had become very anxious as to the advice I was giving in regard to the "straightening of the teeth"! Circumstances bringing under my care many of the smaller children, I felt acutely the responsibility of advising them as to the future, the more so as my knowledge of orthodontics seemed hopeless. It was then I came across the late Dr. Bogue's first articles on "Orthodontia of the Deciduous Teeth." He wrote this series of papers between 1912 and 1913. They are bound as a small volume in the library.

I had been struggling with the tenets of the "Thirty-Two Teeth School" and there seemed so much sense in his recommendations to watch deciduous

**The Future of Medicine*, Sir James Mackenzie. Part I, page 1.

†*The Future of Medicine*, Sir James Mackenzie. Chapter I, page 8.

‡Transactions of the British Society for the Study of Orthodontics, 1909.

arches carefully, that it helped me to regain my balance after endeavoring to treat several cases in the way in which I considered Dr. Angle would have treated them. In justice to Dr. Angle's precepts possibly my diagnosis was incorrect, for the subsequent history of the cases was not ideal. The patients and their parents were satisfied, but I wasn't. In fact every time I have seen them in after life the size of their smiles has reproached me.

While following up Dr. Bogue's exposition of the value of spreading the deciduous arches at an early age by fixed appliances, I came upon the Badcock expansion plate, and to those who have realized the enormous benefit which can be brought to the assistance of occlusion by a timely expansion of the arches, this screw has appealed as a most convenient method. To me it has proved invaluable, for I have found in the past that facilities for the carrying out of adjustment or repairs to fixed appliances by a sufficiently skilled technician in the localities of schools has been absent; whereas often an intelligent child with careful directions and superintendence from a school matron can manipulate such a jackscrew. School authorities are more likely to fall in with the shorter visits to the profession for the requisite degree of supervision.

I have slightly digressed from the line of my subject, but as I mentioned removable plates, I felt it advisable to give my reasons for their use.

With the advance in the teaching of orthodontics in our dental schools these difficulties are gradually disappearing. The immense advantages of a delicately adjusted fixed appliance in a narrow arch, when once seen and realized, cannot be overlooked. We are blind to our little patients' interests and comfort if we do not persist in familiarizing ourselves with the modern varieties of the lingual arches and other devices which the advance of specialism has materialized.

I have always worked in a central practice and visits are usually made in passing to and from school. Many school children demand attention during the same days, and I have found it quicker to make a removable appliance in the form of a plate than to make the alternative type. Where, however, the use of a fixed appliance has obviously been an advantage, special arrangements have had to be made to bring them to town.

When it is a matter of spreading the arches and time is the obstructive factor to making fixed appliances, I frequently combine the use of a Badcock expansion plate in the upper arch with that of a lingual bow in the lower, and find that my ultimate ends are attained satisfactorily.

There is, at times, the advantage that the treatment of distocclusion can be initiated by a biting plane pending an opportunity for longer sittings when fixed appliances can be made.

Undoubtedly our first duty to children is to see that their mothers and nurses are fully aware of the evil of using "comforters," and the danger of allowing the instinctive act of sucking the finger or thumb in infancy to become a confirmed habit in childhood. I have found that it is still necessary to press these points, as there are some, even in this generation, who are not fully aware of the wickedness of it. I have come across cases in which the

habits thus formed have persisted into adolescence; the patients themselves have confessed as much to me.

I have now under treatment two bad cases of malocclusion in the deciduous dentition, induced by blanket sucking. Treatment was commenced respectively at the ages four and one-half years and six and one-half years.

The maxillary arches in each case have been spread so far that they have dropped over the mandibular arch into almost complete buccal occlusion, corresponding facets having been worn on the buccal and lingual surfaces of the mandibular and maxillary molars respectively.

Speaking of these cases, I remember Mr. Badcock remarking one evening that he had known a number of children in whom the tendency to suck the finger or thumb of one hand was supplemented by a desire to finger simultaneously something soft with the other, such as their hair or a woolly garment.

In my experience, it is unusual to come across cases of lip sucking before the advent of the permanent incisors, but it is always possible to foreshadow from the deciduous dentition the ultimate relationship which will render the habit possible. Distocclusion with closeness of the bite and lack of expansion in the upper maxillary region point to its occurrence on the eruption of the incisor teeth, and steps should be taken to prevent it.

In the act of sucking the lower lip, it is drawn up behind the maxillary central incisors over the mandibulars, inclining them lingually. With the restriction of the arch, the latter are then driven upward, arching in the familiar contour of a fan.

I showed at a meeting of this Society such a case I had treated, in which the occlusal edges of the permanent central incisors were carried up into the vault of the palate. The models are now in the museum. Fortunately, it was not a case of true distocclusion, though the mandibular teeth were half a unit distally in relation. It yielded to simple expansion of the arches. In the upper, in addition to a Badcock screw, I used a biting plane to assist in depressing the mandibular incisors. In the lower, lingual finger-springs exerted pressure simultaneously to carry forward the fan-shaped incisors. This movement was accomplished between the ages of eight and one-half and ten and one-half years when, let it be noted, at this time there was a favorable period of growth in the anterior mandibular region.

In Angle's classes and divisions characterized by a shallowness of the bite, it is important to discover a means of promoting the eruption of the molars and premolars to their full height. When initiating treatment in the deciduous dentition I make use of Warwick James' method of capping. I rarely use it for treatment when the second molars are erupting, though I did so with great success a few years back in treating a distoclusal case aged eleven and one-half years. The possibilities of treatment had been overlooked by those responsible, but the forward position of the mandible has been secured. By expansion and capping the first upper molar and two premolars on either side the efforts of the second molar to erupt to a normal height were aided and abetted. The enamel of the teeth was particularly resistant to caries, and none occurred, though the plates were worn for several years. I do not make a practice of capping the permanent teeth, however, owing to

this risk. In treating deciduous arches I cap the molars when the permanent neighbors are rising; but a note of warning must be sounded not to use the plates for too long a period as the deciduous molars appear thereby to lose height themselves and thus the advantage to the oncoming premolars is liable to be lost.

I have seen the practice of capping the teeth condemned as useless, the plaintiffs pointing out that the elongated teeth bite down into their original position again. That is so if the practice of capping is not made use of at the physiologic period of eruption. If this principle is followed, I have found that the teeth do not change their position again vertically. There is no doubt that the difficulty in retaining many completed cases is due to the lack of vertical height in the molar and premolar regions, and I must say, I have found the method of capping I have mentioned of immense value if cases are selected judiciously.

For the detailed explanation of this treatment I would refer you to Mr. Warwick James's article, or to the museum of the British Society for the Study of Orthodontics where there is a set of specimens. (Reference, British Society for the Study of Orthodontics, page 56, 1921.)

Dr. Harvey Stallard of San Diego has published* particulars of posture cases in which the effects of a child sleeping on a large smothering pillow are shown. He points out that in order to secure freedom of intake for respiration the child raises its face by sleeping on the hand or arm. A child which habitually shows a preference for going to sleep on the right side thus favors the application of force always to that side, or of course it may be to the left.

The malign influence of pressure from the hand or arm would sufficiently account for asymmetry in a number of cases, the etiology of which has puzzled me considerably in the past. Incidentally, in the case of my youngest child when fourteen months old, I was able to observe precisely the effect of the large soft pillow which has been described, and a harder pillow was substituted, when she at once dropped the custom of interposing the hand. There are many little tricks to which a child may persistently resort, and it is necessary always to keep our eyes open for them.

I believe in most of the cases where the resultant deformity of the teeth or arches shows signs of exaggeration, that there is a predisposing cause in the presence of a small or large degree of rickets. In such cases, by the use of tact, we may be able to bring our suspicions to the notice of the doctor, or mention them to the parents, but it is sometimes wiser to approach the medical attendant first.

In the case of the two children who sucked their bed blankets, a tendency to distocclusion was present in each which would certainly have demanded treatment. It is most probable also that in both a slight degree of rickets had existed.

It is our duty in preventive malocclusion to impress upon the powers that be the necessity for the treatment and careful retention of all the deciduous teeth till such time as their successors are ready to erupt, and that if any

*J. A. M. A. 87: 2058, 1926.

teeth should be lost the child should be brought for a splint to be made to retain the spaces. A small vulcanite plate is quite sufficient.

It is extremely unwise to attempt to plan out orthodontic treatment of any case without having first secured radiographs of all the teeth showing the conditions subjacent to them. Again and again I have found that my casual projection into the future has been nullified. There is no difficulty in obtaining radiograms. For tiny mouths I take the film used for adults and bend it sharply into the shape of a person when sitting on a chair. This gives three sections; the middle I place between the occlusal surfaces, telling the child to close. I then make the exposure.

Films often show that certain teeth are without their permanent successors. Commonly it is the permanent successor of the second deciduous molar which is absent, but frequently the maxillary permanent lateral incisors are the absentees. Most usually, there is no sign in the film of any organization connected with the formation of a permanent tooth whatever.

On no account should we be content with anything but films of both sides, for symmetric absence of teeth is quite usual.

In an endeavor to forecast the development of a child's face, it is of the greatest assistance to obtain the attendance of both parents, for it is possible to recognize where their chief characteristics may exert an influence.

On this account, too, the acquaintance possessed by a general practitioner with various members of a large family, becomes of the greatest value in considering schemes of treatment.

In regard to cases of calcium deficiency, it is noticeable at times that some cases of nasal or postnasal obstruction have offered ample opportunity for the lateral caving in of the maxillary arch, and that little alteration in contour has occurred; whereas there are others that astonish us, owing to the lateral compression of the arches which has taken place where a much smaller degree of nasal stenosis seems to have been present. The deficiency of calcium salts would, I think, account for this apparent anomaly.

If you have accustomed yourself to the appearance and features of the normally developing arch, on comparing the occlusion of a series of models you will quickly determine if any tendency to growth in a wrong direction is occurring.

I like to see children at as early an age as they can be shepherded to me, certainly not later than three. With tact, impressions can then be successfully taken, though possibly not at the first visit: it never does to push a child beyond its comprehension of what you are doing. Ignorance at this age nurtures fear.

With these models a series can be started for reference. Note that when placing the models in boxes, a wad of newspaper should be placed in the vacant section next the loose cardboard partition. I have found recently, that for the want of this precaution, several interesting models have been mutilated.

I would recommend the intercanine measurement of the palate and that of the deciduous maxillary central incisor being made at once, and entered upon the history card; later, in addition to the regular palatal measurement,

the width of the permanent incisor should be noted, for this is a determining factor in deciding whether to treat the case by expanding any portions of the arch.

For detailed consideration of the advantages of early treatment and the age at which treatment should be begun, I recommend you to read Mr. Harold Chapman's paper written for the International Congress, 1926, and in case you should not have come across the latest contribution on this point, you should look up the December number of the *Journal of International Orthodontics* (1927). It contains the replies to Dr. Gray's questionnaire, which was circulated to many prominent orthodontic specialists. In their replies the question of age is dealt with and several other important factors.

Personally, I feel that there can be no rule, and that a norm cannot be established for the minimum growth of the arches at any particular age; race and idiosyncrasy and health are against it.

Those wishing to learn must start for themselves at once to gain experience. This alone will teach them if treatment of the deciduous teeth in any particular case is desirable, and when it should be started.

A NOTE ON CERTAIN HISTOLOGIC RESEARCHES OF DRS. STEIN AND WEINMANN ON THE MOVEMENT OF TEETH*

BY MRS. LINDSAY, L.D.S., ENGLAND

DRS. STEIN and Weinmann noticed in their histologic research that in normal jaws—in a mesiodistal section through the jaws and teeth—there was a feature which presented itself with unfailing regularity, namely the deposition of a certain kind of bone at the distal surfaces of the roots of the teeth. This bone was entirely different from any other bone in the body; it was as different from cancellous bone as it was from compact bone. It had a slight resemblance to the bone described by Weidenreich at the insertion of the tendons of the muscles in the other bones of the body, but the bone described by Weidenreich as fiber bone consisted of single fibers; whereas this bone consisted of bundles of fibers and on that account the authors named it bundle or fascicular bone. It was found on the distal surfaces on the coronal two-thirds of the root tapering toward the apex, and when it appeared on the mesial aspect of the root it was in isolated patches. The fibers of the suspensory ligament did not go into the bone on the mesial side, whereas on the distal side they were continued into the bundle bone.

On the mesial side of the tooth, on the other hand, there were found evidences of absorption. Therefore in the interior of the alveolus the bone round the roots of the teeth is built up distally and removed mesially, the result of tension at the distal, and pressure at the mesial side. In the incisal region in the maxilla there were evidences of a labially-directed movement since on the palate side of the roots bundle bone was found; the opposite case was observed in the lower jaw showing that the mandibular incisors move in a lingual direction. The cases where islands of bone were found on the mesial side of the root were those in which no movement had taken place for a long period.

DISCUSSION

Mr. Bulleid asked if the deposition of bone which Mrs. Lindsay had shown was not confirmatory of Brash's findings in the pig, where Brash showed the deposition of bone on the distal surface of the root as also taking place in the front.

Mrs. Lindsay replied in the affirmative, stating that the researches of Stein and Weinmann show that by means of histology it is possible to corroborate the findings of Professor Brash. This movement appears to continue throughout life, taking place in a slow and steady manner, the contact points being worn down to contact surfaces. Thus the teeth travel in the alveolus and build it anew. These were teeth in a normal mouth. The first case shown was that of a patient, aged 30 years, who had died of pneumonia, and the second was 28 years.

Mr. R. Lindsay asked whether it might not be possible that Stein and Weinmann had mistaken the appearance for well-developed Sharpey fibers, because it seemed curious that in all the microscopic sections which had been seen of bone around developing and moving teeth no one else had discovered this type of bone. He was certain there were many sections of a similar magnification extant. He suggested to Mrs. Lindsay, therefore, that perhaps later on Stein and Weinmann might find that this was simply a somewhat exaggerated development of Sharpey's fibers due to some local condition which they had not appreciated at the time.

Mrs. Lindsay replied that Stein and Weinmann suggested that the fibers of Sharpey were woven into the bundle bone, therefore she did not think it could be the same thing.

*Transactions of British Society for the Study of Orthodontics.

TERATOLOGY OF THE HUMAN JAW*

BY DR. EMIL HERBST, BREMEN, GERMANY

Privatdozent of Orthodontia of the University of Münster

THE modern dentist should have an idea of the teratology of the human jaw. Teratology is the science which treats of the formation of monstrosities which can occur in fetal life. There are two different kinds of malformations, the double and the single; both are symmetrical or asymmetrical.

By symmetrical double formations is meant that the twins are of the same size, while the asymmetrical ones are of different size. All such twins are grown together. Sometimes asymmetrical ones are only very small parasites.

The single malformations belong to one individual only; they are symmetrical or asymmetrical. The symmetricals have no processus frontalis or only a very small one; or they have no processus maxillaris and mandibularis at both sides, while the asymmetricals are lacking in development on one side of the face only. All malformations are congenital, they may occur through inheritance or be acquired during fetal life.

We should always discriminate between malformations and variations; malformations disturb the function, variations do not, an anomaly disturbs the function more or less, but is only a little different from normal. For example, a variation is a small antrum on one side and a large antrum on the other. An anomaly may be an irregularity in the position of the teeth, while a cleft palate, micrognathia or a missing premaxillary bone is a malformation.

Now let us examine a set of slides and consider all these malformations. What I want to discover is the condition of the jaws and the answer to the question whether it is possible to find out any etiologic causes for the deformities of the jaws and teeth in postnatal life by examining the conditions during fetal life. I believe the double, and especially the single malformations, will give us a good idea of the development of the clefts and of the irregularities of the teeth in the middle of the maxilla. An arrested development of the processus frontalis is the cause of small premaxillary bones, and small premaxillary bones are the cause of a malposition of the maxillary incisors. A malposition of the maxillary incisors is a cause of a small dental arch in the maxilla and a small maxilla causes a small mandible, or a case of Class 2.

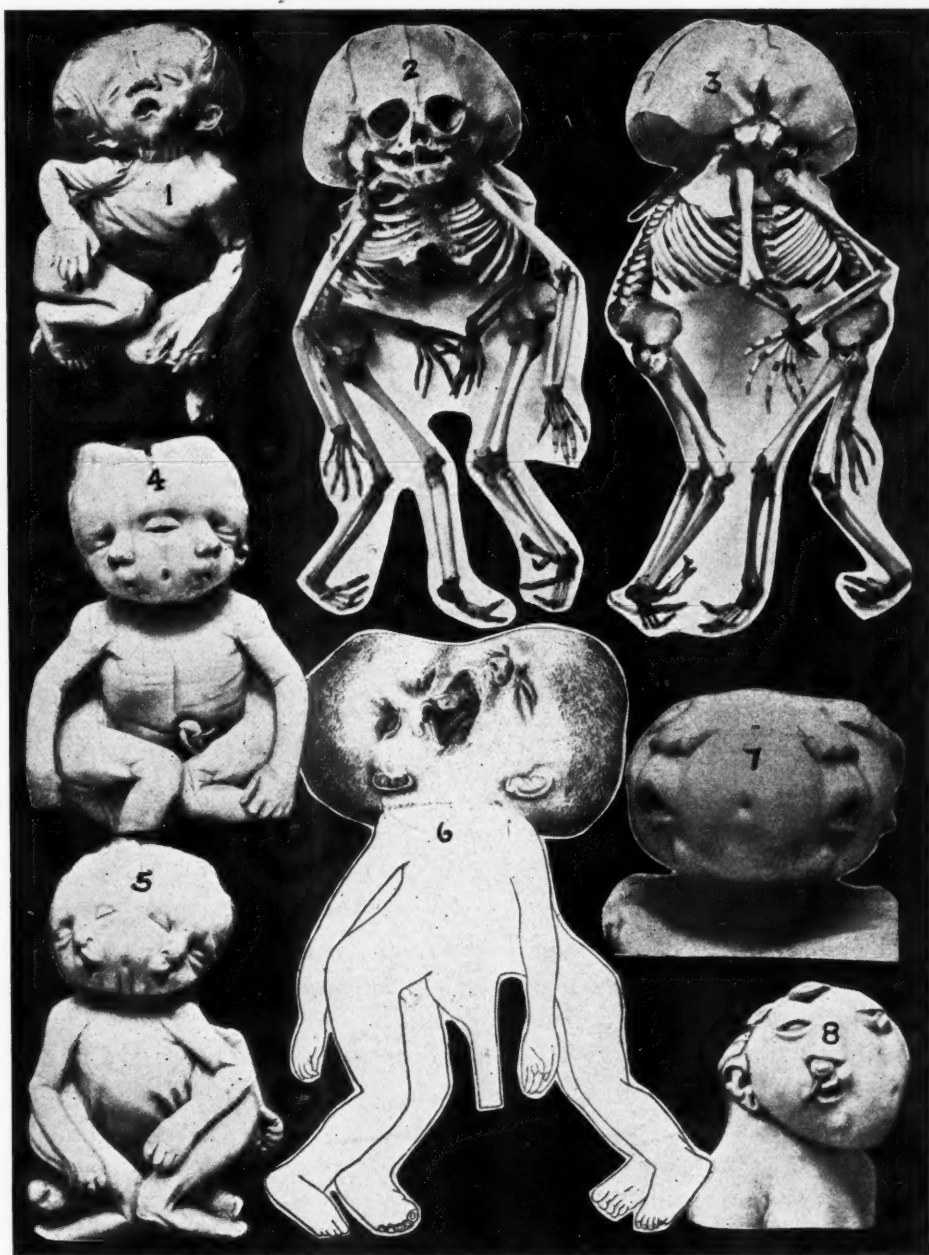
CEPHALOTHORACOPAGUS MONOSYMMETROS

Fig. 1.—The twins are opposite each other, you only see the two legs and the right arm of the child to the left, the left arm is invisible, also the right arm of the other side. The heads are twisted a little, that of the child to the

*Read at the European Orthodontological Society's Congress.

left is turned to the right, of the other one to the left. There is only one mandible, but this jaw contains the structure of the two mandibles.

The right maxilla and parts of the premaxillary jaw of the child to the left, are connected with the left maxilla and parts of the left premaxillary



Figs. 1-8.

jaw of the child to the right. The slide does not show where the other parts of the jaw are to be found. The question is are there still rudiments of them inside the skull? There are indications of a third eye.

SKELETON OF THE CEPHALOTHORACOPAGUS MONOSYMMETROS

Figs. 2 and 3.—We easily recognize the arms and the legs. There is such a slight twist to the right that we are able to perceive on the distal parts of the mandible, the cavities of the ears. The orbits are very big and the mandible is also. We do not get the impression of the eye being seen from the side but from the front. So it seems that a common orbit of unusual size has been formed. At any rate, complete and premature fusion must have taken place but only in the front parts of the brain and in the skull, while the small parts of the cerebellum are of normal size.

CEPHALOTHORACOPAGUS WITH THREE EYES

Fig. 4.—Here the heads are farther apart, there are two complete maxillae and mandibles, the latter are perhaps joined in the middle, but this is mostly not the case. The small opening between the two slits of the mouth is the common ear hole of both individuals.

Notice the big eye in the center. Here you see plainly how through the fusion of the two orbits a very big one has been formed—a cyclopean eye.

CEPHALOTHORACOPAGUS WITH FOUR EYES

Fig. 5.—This creature has four eyes in accordance with the respective positions of the heads. The maxillae are of normal size, the mandibles are lying with their ascending rami near each other. Especially remarkable is the curious malformation of the palate and the hare-lip, which takes a turn either to the left or to the right side.

Here it is proved that no amniotic unplacement has caused the hare-lip, or else this unplacement would not run symmetrically. In any case, it is strange that both individuals have hare-lips and that the latter run in different directions, above all, from the middle to the sides. The opening between the two mouths is the common ear.

PROSOTHORACOPAGUS

(According to Barkow)

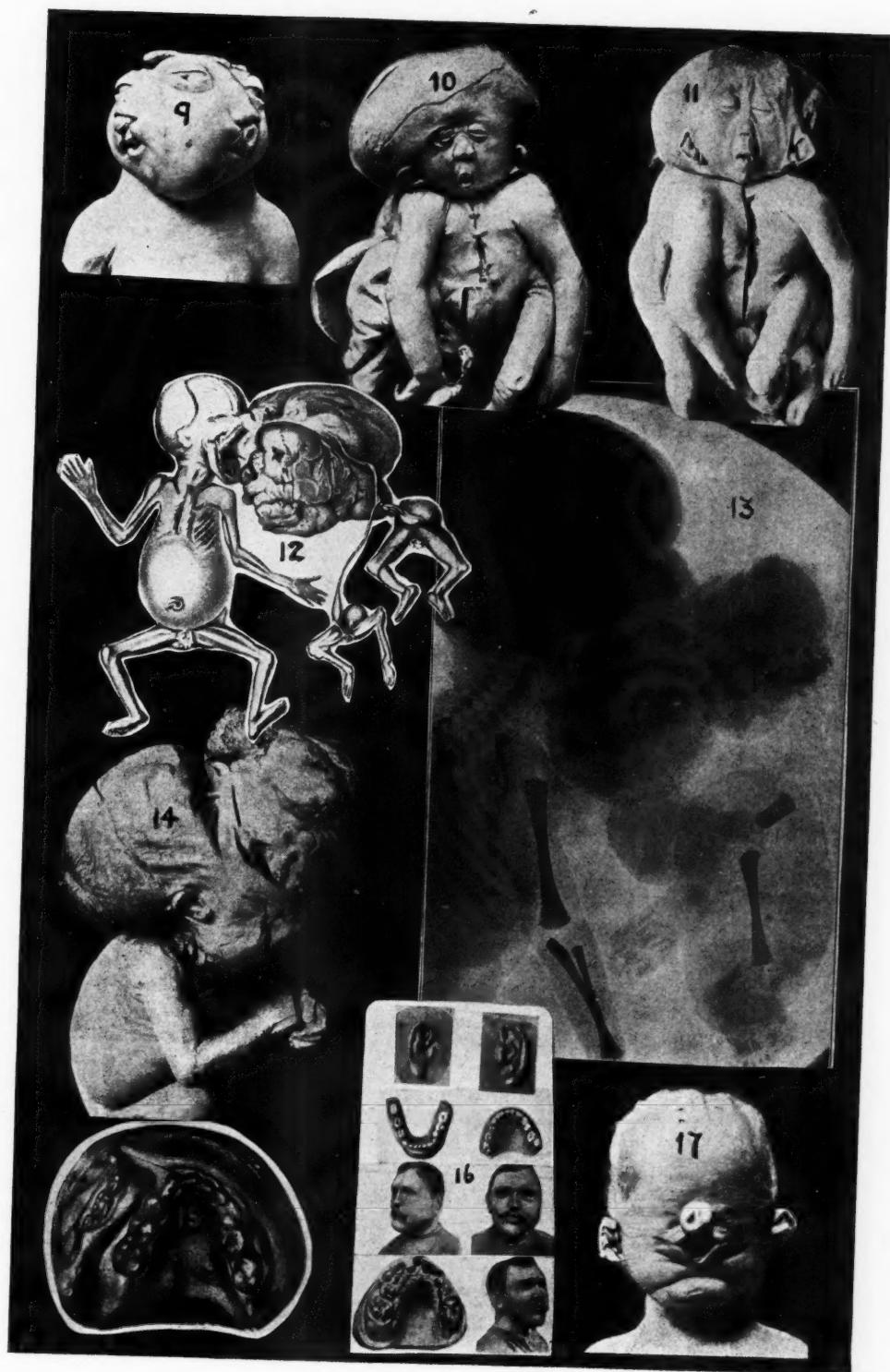
Fig. 6.—An intermediate form between thoracopagus and cephalothoracopagus. The parts of the brain are perfectly separated, only the faces have been partly grown together and partly blended. Both individuals have a fissure in the palate. On the part not shown in the picture there are two other well-developed ears.

Nothing is known about the condition of the jaws, but it is assumed that the outer parts of the jaws are perfect, while the adjoining ones must have grown together or are blended.

DUPLICITAS ANTERIOR

(According to Schralbe)

Fig. 7.—This is acrania. Up to the third cervical vertebra there are still traces of duplication. The two apertures in the center of the face might indicate rudiments of the eyes and the ears. There will never be one with three mouths.



Figs. 9-17.

DUPLICATUS ANTERIOR WITH TWO CLEFT PALATES
(According to Prof. Borst of Munich University)

Figs. 8 and 9.—Three eyes are distinctly to be recognized, the middle one decidedly larger than the lateral ones (eye of a cyclop). The aperture between the two slits of the mouth is probably an ear hole.

Remarkable is the double cleft of the lips and the palate of both individuals. The projection between the two clefts is the end part of the processus frontalis.

CEPHALOTHORACOPAGUS DISYMMETROS

(From the Pathological Institute of Prof. Borst, Munich University)

Figs. 10 and 11.—Here the eyes are small but normal in size compared with the cephalothoracopagus monosymmetros. The existing material has developed into two separate eyes. The face of one side is composed of that of both twins united, the face of the other side also. Fig. 10 shows one front, Fig. 11 the other front. If the left side of one face be covered up, you might imagine you are looking at the profile.

EPIGNATHUS

(According to Baart de la Faille)

Fig. 12.—If the twins are different in size they are called parasites. Parasites of the head are named epignathus and paragnathus. The epignathus is situated on the palate, the paragnathus on the mandible or on the neck. This picture shows an epignathus with navel strings.

This pregnancy of quadruplets was terminated in the middle of its course. The first of the quadruplets was nearly normal, while the second in the form of an epignathus of the size of a plate was hanging out of the mouth of the first quadruplet, and the third and fourth, attached to the epignathus as acephalia with navel strings, joined fork-like, were joined to the palate of the first quadruplet and there communicated with its vasa sphenopalatina vessels.

ANOTHER KIND OF EPIGNATHUS

(According to Schwalbe)

Fig. 13.—We recognize clearly two extremities, the rudiment of a hand with but one finger and the fastening of the epignathus to the base of the skull. The upper part of the epignathus does not show any bones.

ANOTHER EPIGNATHUS

(According to Schwalbe)

Fig. 14.—A male child, 29 cm. long, weighing 750 gr., with thin woolly hair on chest and shoulders. From the mouth comes a tumor, with a rough surface, full of cysts, it is nowhere joined to the edges of the mouth, the upper part of the face and the mandible are very much displaced, also the regio submentalis pushed to the front like a ball. There are no organic parts to be seen in the tumor, which is filled with cysts.

The mandible is composed of a thin layer of bone; the tongue, being pushed away, is only a thin leaf. Sometimes the epignathus is very small. It looks like a little torus palatinus, but if you cut it up, you will find hairs and small teeth in it. All such monsters belong to twin formations.

PARAGNATHUS
(According to Meyer)

Fig. 15.—This paragnathus is also called angnathus. This deformity is characterized by a mandible, which is fastened as a parasite onto the normal mandible. The parasite is a second rudimentary lower jaw, with teeth. This malformation is very rare.



Figs. 18-26.

A PARAGNATHUS CONFUSUS
(According to Clerc and Port)

Fig. 16.—Below to the left a case of Clerc, Bordeaux; the other figure shows a case of Port, Heidelberg.

It is evident that the jaw on one side is much larger than on the other; the teeth on this side are about double the size of the teeth on the other side: only the incisors are of the same size on both sides. This proves that the teeth of the premaxillary bone are free from any malformation. In my opinion, the processus maxillaris and mandibularis are double only on one side of the face. The ear is larger on the same side, for a large part of the ear is formed by the processus mandibularis.

All these creatures show that we have in fetal life a great number of possibilities, which gives a great variety of twins. Each set of twins are of the same sex. Much more interesting to the dentist are the single malformations. We will try to prove it by some pictures.

A CYCLOP

(According to Borst and Herbst)

Fig. 17.—A real cyclop has no processus frontalis. In our first picture we see a cyclop with a strongly developed snout about the four-cornered orbit. Two wrinkles below, bent toward each other. Far below, the mouth opening is near the chin. Mandible little developed, more so in the ascending rami. Ears are deformed, helix as well as tragus, in consequence of the defective processus mandibularis.

ANOTHER CYCLOP

(According to Borst and Herbst)

Fig. 18.—The eye shows wrinkles at the sides, which points to a lateral lengthening of the orbit. The mandible is perfectly normal.

ANOTHER CYCLOP

(According to Borst and Herbst)

Fig. 19.—The eye is below the perfectly developed snout. Mandible well developed. In all these cyclops we find no sphenoidal bone, no vomer, no premaxillary bone, no incisors, but in very exceptional cases the small incisors. The palatine suture is always missing. The maxillary bones have grown together very early. A cyclop only lives a very short time.

DIVIDED HEAD OF A CYCLOP

(According to Borst and Herbst)

Fig. 20.—The snout is small, the eye a little covered by it. Mandible normal. In Fig. 21, the black triangle in the center is the mutual orbit, tongue, plainly recognizable, also the "retronasal."

Between eye and tongue is a strong layer of muscles, Fig. 21, which is intersected by the eye in the shape of a wedge.

ARRHINENCEPHALIE

(According to Borst and Herbst)

Fig. 22.—In this case, the snout is situated between the eyes, which are close to each other. Middle of jaw wanting, mouth opening large, submental part very much swollen (cyst). The ears lying high up indicate a strong development of the mandible.

ARRHINENCEPHALIE WITH MISSING PREMAXILLARY BONES

Fig. 23.—A false median cleft palate is shown here. Nose is missing, also the lower part of the frontal process (no premaxillary bones), hence the illusion of a median slit.

LITTLE CYCLOP WITH A LONG SNOUT

Fig. 24.—The mandible is well developed, the whole premaxillary bones are wanting. Snout very marked, but between the eyes or only a little above them.

OTOCEPHALIE

(Stomatocephalie According to Borst and Herbst)

Fig. 25.—Otocephalie means that the ears are near together. The maxilla and mandible are rudimentary, also the processus frontalis. In these cases we only find one eye, no premaxillary bones.

Our picture (according to Borst and Herbst) shows a race called "Stomatocephalie." The mandible has no ascending rami. This is a combination of cyclopie and otocephalie.

SPHAROCEPHALIE (ANOTHER COMBINATION OF CYCLOPIE AND OTOCEPHALIE)

Fig. 26.—There are no eyes. The spot in the middle of the face should be considered as the rudiment of a snout. Big ears are close to each other, for the mandible is missing.

The "meati auditorii externi" are close together. The tragus, helix and helix ascendeus are wanting.

Single malformations give us a clear conception of what happens when some of the embryonic elements are missing, or if they are only of rudimentary structure. In cases where the processus frontalis is wanting there are no premaxillary bones, in cases where this processus is rudimentary there is only a very small premaxillary bone. In the latter case the bone is not big enough to give room for the incisors. The incisors will have a wrong position and the maxillary bones will be near together. The mandible and the teeth have no opportunity to form a normal occlusion and thus is shown the reason of many irregularities of the position of the teeth in the rudimentary processus frontalis.

In cases where the maxillary and mandibular processes are rudimentary, the mandible and both sides of the maxilla will become too small, and we find an explanation of many of the irregularities of the human jaw. It will not do to look for the etiology of the deformities of the jaws and position of the teeth only in circumstances which arise in the postnatal life; there are many causes for these defects in fetal life.

Phylogenetic development shows a retrogression of the processus frontalis; We often see nice-looking girls (film stars) with very short lips, who always show their teeth—the middle part of the upper lip is formed by the processus frontalis—these girls show a picture face. We shall eventually lose our second incisors, second premolars and wisdom teeth in the maxilla, and the middle incisors, second premolars and wisdom teeth in the mandible.

Teratology is calculated to open new doors to the science of orthodontia.

ORTHOGNATHIA*

BY DR. EMIL HERBST, BREMEN, GERMANY

Privatdozent of Orthodontia at Münster University

THERE are didactic reasons for making a difference between orthodontia and orthognathia. Orthodontia is the science and treatment of malocclusion of the teeth; orthognathia is the science and treatment of malposition of the bones (gnathos-jaw).

THREE EXAMPLES OF ORTHOGNATHIA

(a) The mandible may be of normal size and have a normal set of teeth, but may be in abnormal occlusion, should the mandible lie a little behind: this is a case of orthognathia.

(b) The maxillary bone may be apparently of good form with a symmetrical set of teeth, but should the whole middle face be too small and the internal form of the nose not broad enough, the premaxillary bones are hypotrophic, the maxillary is a little too narrow: this is a case of orthognathia.

(c) The premaxillary bones may show a good alignment of the front teeth, but if the second incisors are placed very near the first bicuspid, the premaxillary bones have a wrong position: this is a case of orthognathia.

In all these cases it is not necessary to regulate the position of any individual tooth, for the teeth themselves are in their normal positions in the bones; it is only the bones that are wrongly placed in the face. This is then not orthodontic work; you must do orthognathic work.

Now, in some directions it is not possible to move the jaw; for instance, I cannot move the whole maxilla backward, but I am able to push it sideways by opening the suture; I can also move the premaxillary bones forward, backward, downward and upward, and the mandible in any direction I want to.

The mandible is easily moved, for the jaw is flexibly attached to the skull; the right and left maxillae are attached to each other by the suture, the premaxillary bones have a suture only in the first years of childhood. It will be seen therefore that there are some differences between the five jaw bones.

There is only one way to move a jaw bone: that is the simultaneous movement of all the teeth belonging to that bone.

If you try to move a mandible, you must include all or most of the teeth of the mandible in the appliance; if you try to move a maxillary bone, you include all teeth of that bone in the appliance; and if you want to regulate the premaxillary bone, you include the four incisors and move all these teeth together. This is the idea of orthognathic treatment.

I shall now show the appliances I use for regulating bones.

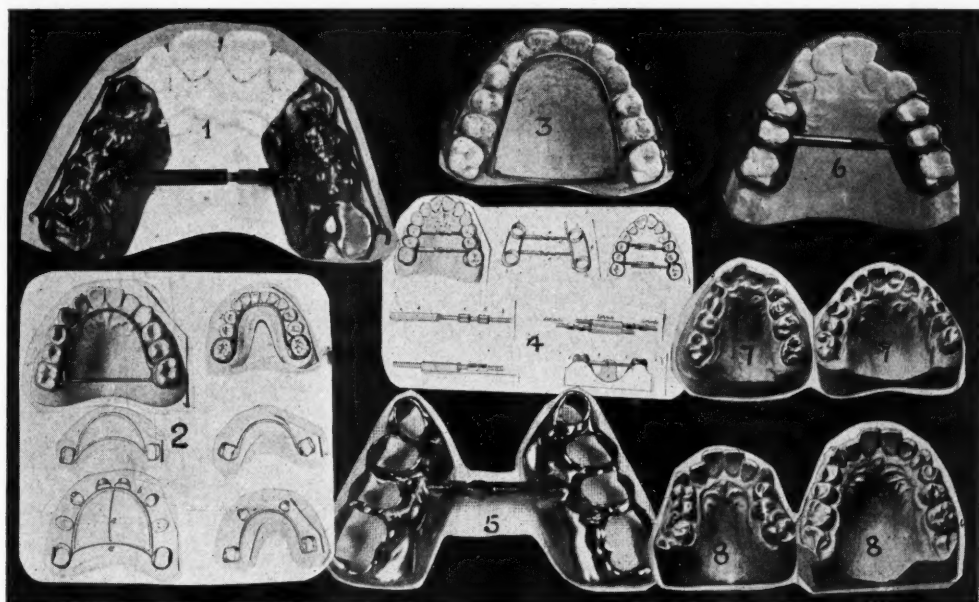
*Read at the Congress of the European Orthodontological Society.

THE MAXILLARY APPLIANCES

The easiest way to remove the maxillary bones apart is to use a screw. Fig. 1 shows the appliance with two caps. I give a millimeter expansion a week or a little less, by giving the screw a half turn each day excepting Sunday; the patient feels no pain. In from four to eight weeks the treatment is completed and I retain the expansion with a lingual arch made in platinized gold, Figs. 2 and 3.

Instead of caps, bands may be used; soldered together, Fig. 4 or cast as in Figs. 5 and 6.

Sometimes it is necessary to move the right maxilla a little further forward; then you solder the screw in a diagonal direction.



Figs. 7 and 8 show the results of orthognathic treatment in two cases; the teeth did not lose their relations to each other, only the vault has become widened.

THE PREMAXILLARY APPLIANCES

Fig. 9 shows an appliance with screws, for regulating the maxilla in the region of the premaxillary bone.

Fig. 10 shows an appliance doing the same work with rubbers.

Fig. 11 shows how to draw the premaxillary bone downward. I put on two caps from the canines to the second molars, on each side, and two gold bands on the first incisors. On the bands and the caps were soldered little hooks, as in the illustration and then rubbers were attached to draw the bone downward.

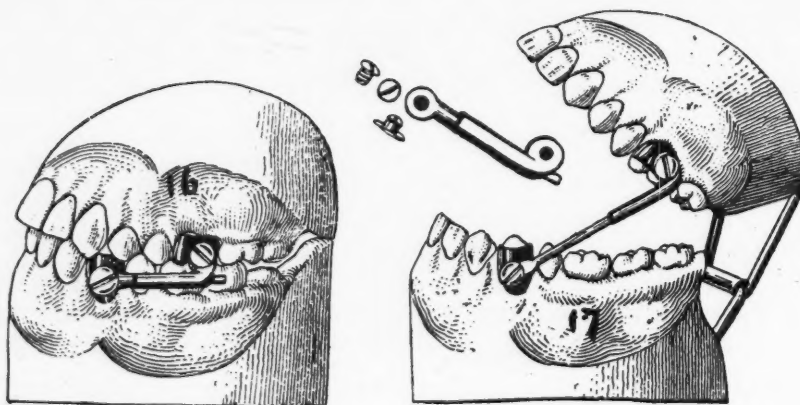
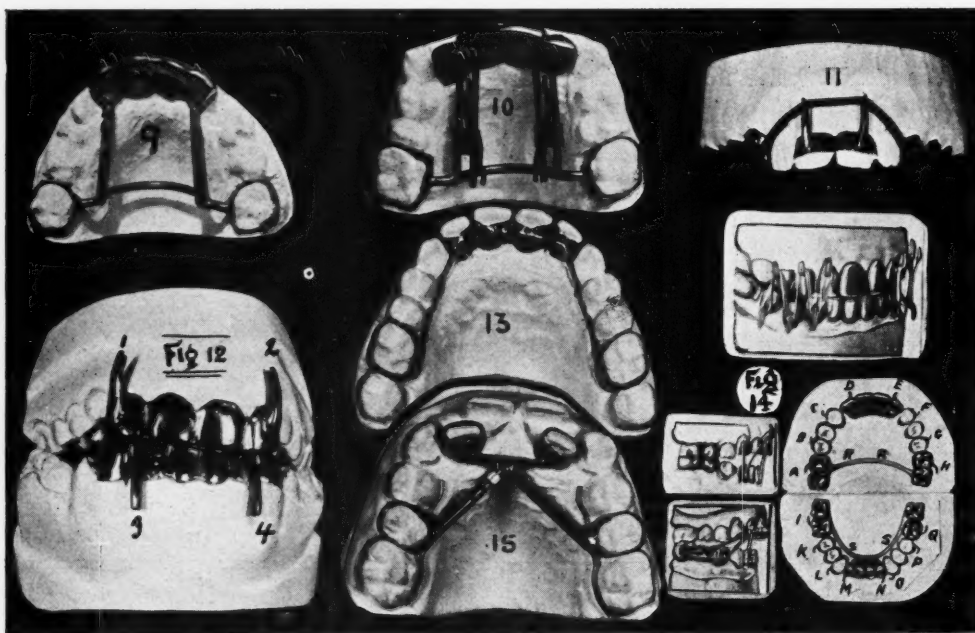
Fig. 12 shows the employment of intermaxillary force to treat open bite. Rubbers run from 1 to 3 and 2 to 4. The retainer is shown in Fig. 13. Four small gold bands on the incisors and two gold bands on the first molars are

joined by a platinized gold wire, which moves the four incisors a little further downward. This wire is the same as used in the lingual arch.

Fig. 14 shows another way to draw the premaxillary bone downward.

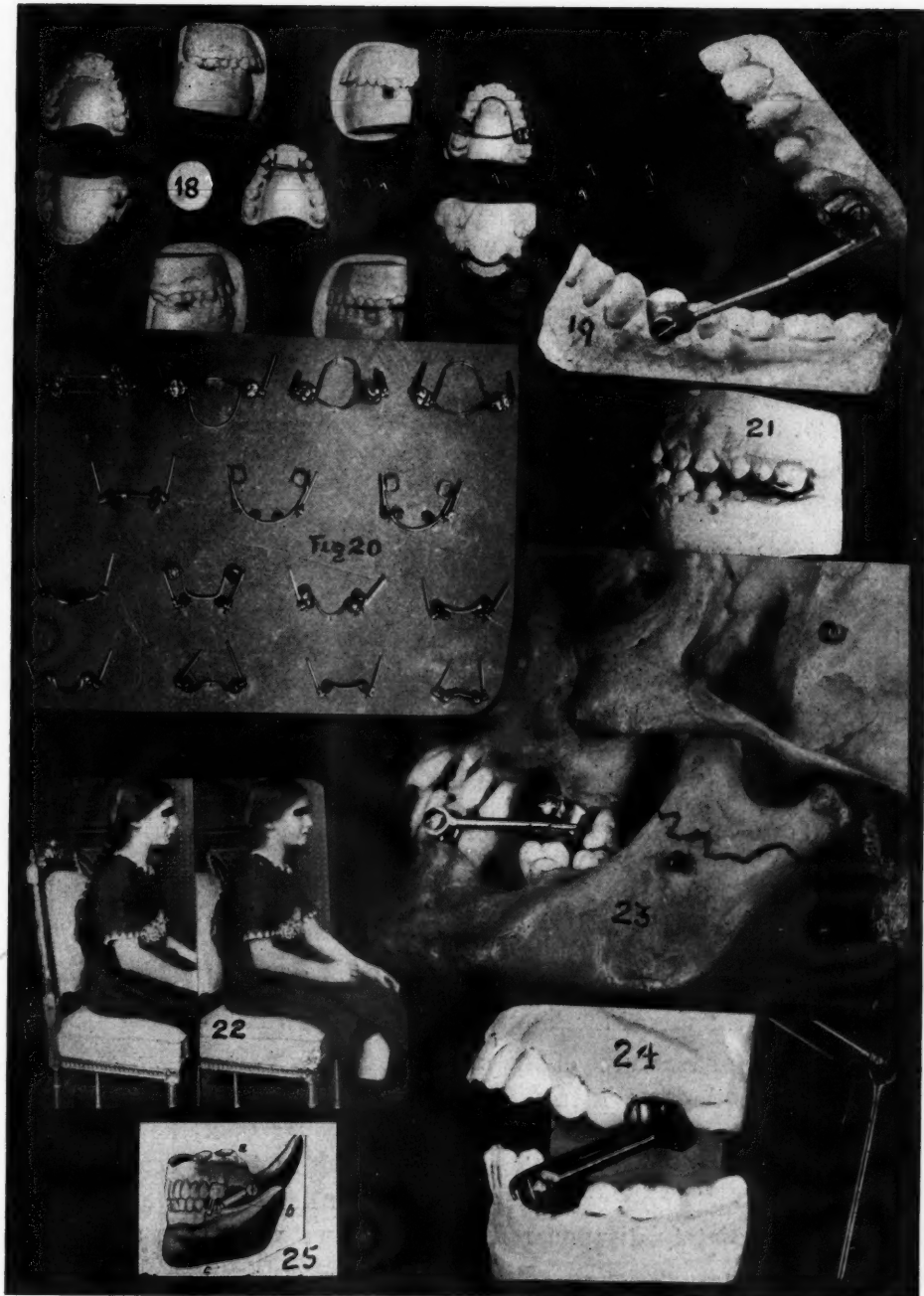
OPEN BITE APPLIANCES

Fig. 15 shows a combination of maxillary and premaxillary orthognathic appliances. While the two small incisors are being pushed forward, the pre-



molars and the first molars are being pushed buccally. Together with the incisors the whole premaxillary bone will be pushed forward.

In the beginning of my paper I said there were didactic reasons for calling some regulating cases orthognathic; in reality this kind of orthognathics is not to be taken without objection, for the internal structure of the bone is always changing. Only the mandible can be treated orthognathically without forcible change of the bone. The difference being that there is no motor



force in the mandibular appliance, while in the maxilla there is always a motor force: screw or rubber.

MANDIBULAR APPLIANCES

The maxilla in cases of Class 2 is easily pushed into the right position. The patient can do it himself, and we only need to prevent the jaw from returning to its first position.

Since I have invented an appliance which does this accurately I need no longer use intermaxillary rubbers. This appliance I call "hinges of occlusion," Figs. 16 and 17.

Fig. 18 shows a case of Class 2, a young woman twenty-three years old. The mandible is in distoclusion, the maxilla not broad enough, the upper incisors lying on the lower lip. In about sixteen days I expanded the upper arch and retracted the incisors. The illustration in the center shows the appliance used. Then I placed the appliance shown on the right. There are two crowns on the maxillary first molars, and two crowns on the mandibular first premolars. On the buccal surface of each crown is soldered a little post, with counter-sunk screw; on each post is a small ring on to which is soldered a tube in the maxilla, and in the mandible a strong wire. The wire fits exactly into the tube. The mandible cannot go back any further for the tube strikes the ring on the first premolar. The idea is to make the tube just as long as normal occlusion requires.

The two illustrations in the upper part of Fig. 18 show distoclusion. The two figures in the lower part show normal occlusion after nine months' treatment. The hinges usually have to be worn from nine to twelve months.

Fig. 19 shows the hinges with the mouth open.

Fig. 20 shows the different ways of fastening the hinges into the maxilla and mandible.

Fig. 21 shows the position of the teeth after the appliance has just been placed.

Fig. 22 shows a child before and after placing the appliance.

Fig. 23 shows the use of the hinges in a broken jaw case.

The treatment of fractures of the mandible is now very easy, you only need an impression of both jaws, then you make the models and put them into an articulator, in their physiologic occlusion; then you adjust the hinges of occlusion on the broken side, and then they are ready to be cemented in the mouth. The patient is now forced to bite just as he did before the accident, all pain has immediately disappeared and after two weeks the appliance can be removed.

Fig. 24 shows the hinges of occlusion combined with a small rubber. This rubber works against the hinges so that the patient must make a little effort to open the mouth. This is on Dr. Rogers' idea, it forces the patient to do muscle exercise.

Fig. 25 shows a case of artificial mandible with hinges in position (after Professors Schröder and Ernst, Berlin).

Now, what are the advantages of hinges of occlusion:

- (1) Rubbers are not necessary.
- (2) The effect of the treatment is seen immediately.
- (3) The appliance is invisible.
- (4) No trouble to the patient.
- (5) No consultations in your office.
- (6) Not motor, only natural force.
- (7) The premolars grow into their natural position, without any effort of the dentist.

In Germany many thousands of cases of Class 2 are done with this appliance. You can experiment with this appliance, and you will find that it is an elegant auxiliary appliance in your orthodontic practice.

CASES OF PRACTICAL INTEREST*

BY HAROLD CHAPMAN, L.D.S., ENGLAND

OCCLUSAL CHANGES AFTER RETENTION

CASE NO. 269.—Class II, Division 1. Unilateral on left, overbite probably excessive. Figs. 1 and 2. Age 9 years, 4 months. Date December, 1918.

The postnormality is about half a cusp on the left side; on the right side the medio-distal relation is approximately normal. Figs. 3 and 4. Age 12 years, 11 months. Date July, 1922.

Occlusion excellent except $\overline{7}$ entirely buccal to $\overline{7}$.

Treatment.—Tooth movement was started December, 1918; completed about December, 1919, except that intermaxillary traction and the opening of the bite were continued until January, 1922. The case was excellent on July 3, 1922, as shown by the Figs. 3 and 4. On this date a maxillary vulcanite retention plate was put in to be worn at night only and gradually to be worn less and less; no mandibular appliance was worn at this time.

The patient was not seen again until October 31, 1927, when the condition was as shown in Figs. 5 and 6. Age 18 years, 1 month. Date Oct. 31, 1927.

The mandibular incisors have become imbricated; the $\begin{array}{c} 456 \\ | \\ 3456 \end{array}$ occlusion is perfect; the corresponding teeth on the other side are not in quite such excellent occlusion, the mandibular teeth tending to be distal.

The interesting point is the imbrication of the mandibular incisors which previously had always been in good alignment; it seems that the cause may be a relapse of the overbite, accompanied by narrowing in the mandibular canine region.

The suggestion that the cause is overbite relapse is supported by measurements, not very reliable, of the amount the maxillary incisors cover the mandibular incisors, and by the apparent higher level of the two instanding mandibular incisors than the other mandibular incisors. It seems remarkable that the mandibular incisors should be moved lingually by the relapse rather than the maxillary incisors buccally; in fact it would almost seem that if there is any change in the maxillary incisor inclination it is in the direction of greater lingual inclination rather than of any tendency toward labial inclination. Possibly a fixed retainer, lingual to mandibular front teeth, for a longer period, would have prevented the relapse, or the wearing of a bite plate.

Others may consider that the crushing of the mandibular incisors is brought about by the eruption of the third molars.

*Transactions of the British Society for the Study of Orthodontics.

OCCLUSAL CHANGES (NO TREATMENT)

Increased crowding of mandibular incisors during an interval of seven years.

CASE No. 875.—Class II, Division 2. Unilateral on right. Overbite excessive. $\frac{8}{8}$
about to erupt.

Fig. 7. Age (adult). Date (about) 1917.

Fig. 7. Age (adult). Date Dec. 3, 1924.

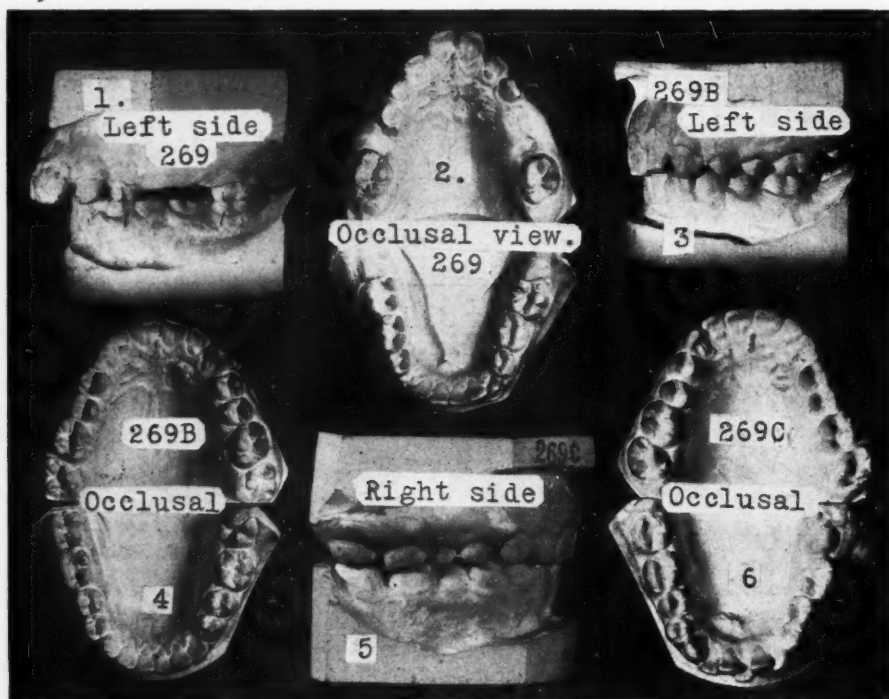


Fig. 7-A.

These models were taken about seven years later than the first.

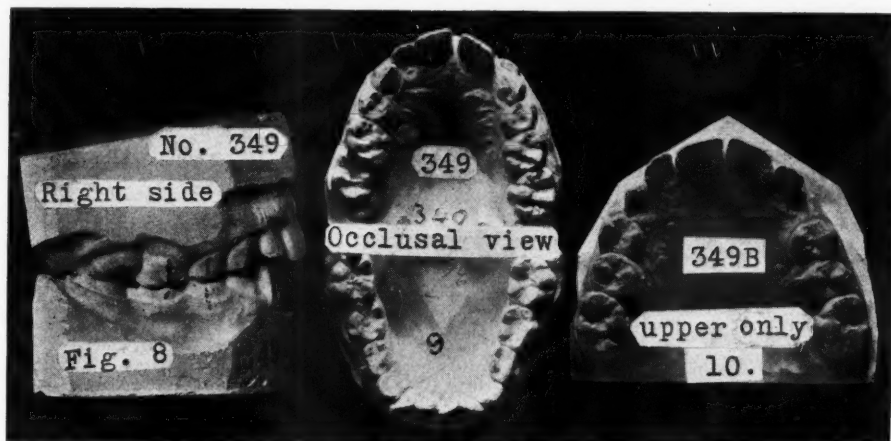
The third molars are erupted.

A comparison of the mandibular incisors shows a definite increase in the crowding in this region.

The models are not satisfactory for comparative measurements to be detailed, but it would seem that the mandibular canine, the mandibular first premolar and the maxillary first premolar widths are less in the later model. The maxillary models and occlusion are not illustrated; these are typical of a Class II, Division 2 (not severe) case.

THREE CASES OF FIRST PERMANENT MOLARS IMPACTED AGAINST SECOND
DECIDUOUS MOLARS

1. CASE NO. 349.—Class I. Small arches 6| impacted.
Figs. 8 and 9. Age 7 years, 10 months. Date June 15, 1920.
Fig. 10. Age 10 years, 2 months. Date October, 1922.
After treatment including tipping back 6|.



2. CASE NO. 338.

- Figs. 11 and 12. Age 8 years, 11 months. Date March 24, 1920.
Figs. 13 and 14. Age 10 years, 6 months. Date Oct. 11, 1921.
March 24, 1920. Figs. 11 and 12. 6| badly impacted against e. There have been
extracted de|cde and de|cd at time of next model.
October 11, 1921. Fig. 13. 2|4 and 3|3 have erupted.

It is presumed no permanent teeth have been removed up to the time of the last models. The patient was only seen twice for consultation and the models constitute the only record of what has been done. $\underline{5}$ is entirely shut out from the arch.

3. CASE NO. 317.—Class I. Slight tendency to be distal.

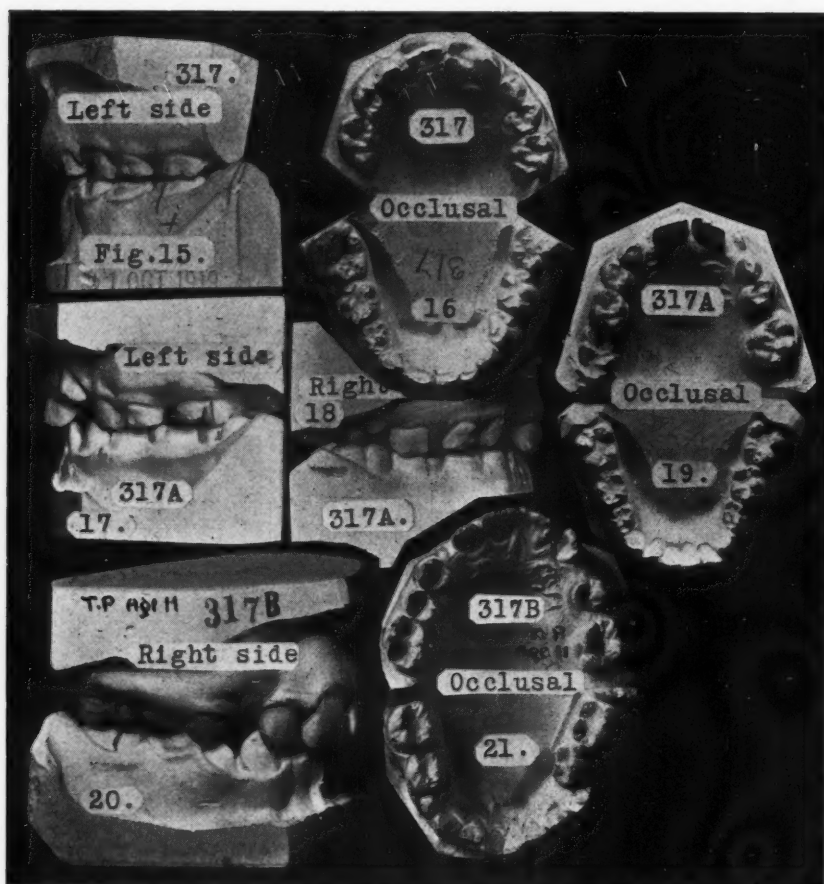
Figs. 15 and 16. Age 6 years, 9 months. Date Oct. 21, 1919.

Figs. 17, 18, 19. Age 8 years, 4 months. Date June 27, 1921.

Figs. 20 and 21. Age 11 years. Date Jan. 18, 1924.

X-rays show $\overline{5|5}$ (or $\overline{4|4}$) are absent (October 23, 1919).

October 21, 1919. Figs. 15 and 16. No permanent molars yet erupted.



May 28, 1920. Another dentist reported $\underline{6}$ impacted against \underline{e} , and should he extract the latter; he was advised to extract \underline{e} . The models do not show the case at this period.

June 27, 1921. Figs. 17, 18 and 19. $\underline{6|}$ impacted against $\underline{e|}$.

July 1, 1921. $\frac{c|c}{e|c}$ extracted to allow $\frac{2|2}{2|2}$ to align themselves, it having been decided ultimately to extract $\underline{4|4}$ (a mandibular premolar on each side is absent).

October 28, 1921. $\underline{e|}$ extracted.

September 25, 1922. $\underline{d|d}$ still firm; \underline{e} space almost closed; $\underline{e|}$ space smaller.

January 18, 1924. Figs. 20 and 21 show $\underline{654|}$ in good alignment, but on left side $\underline{46}$ almost in contact and no room for $\underline{5}$ in the arch. Apparently the original position of the maxillary permanent molar on the two sides was similar, but on the left \underline{e} extracted 1 year 5 months earlier than $\underline{e|}$.

April 1, 1924. $\underline{4|4}$ to be extracted.

NATURAL CLOSING OF SPACE BETWEEN MAXILLARY CENTRALS

CASE No. 5LH. Class II, Division 1. Not typical. Unilateral on left. Large space between maxillary central incisors.

Fig. 22. Age 8 years, 4 months. Date November, 1924.

Fig. 23. Age 11 years, 4 months. Date November 22, 1927, 3 years later.

Class II, Division 1. Typical. The character of the occlusion appears to have changed.

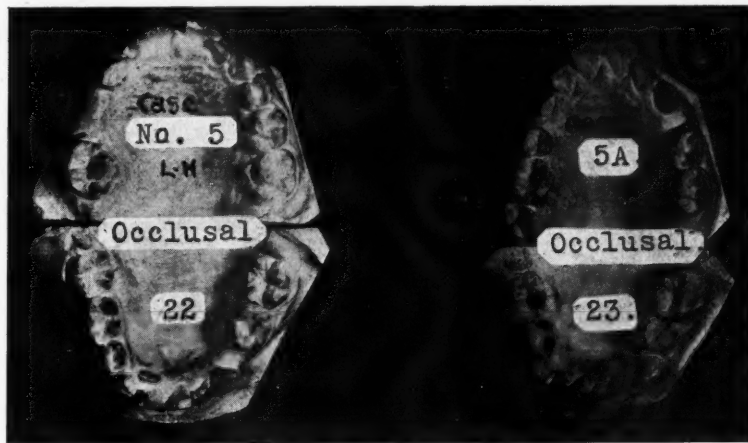
The space between the centrals has closed; in addition, the laterals have come into line, which hardly seemed probable; the mandibular incisors have aligned themselves at the expense of other teeth; the abnormal forward movement of $\overline{6}$ has continued; the same applies to $\underline{6}$ in a less degree.

A CASE OF ABNORMAL OCCLUSION, CLASS II, DIVISION 2, AT SEVEN YEARS AND ELEVEN YEARS. (NO TREATMENT)

CASE No. 763.—Class II, Division 2.

Figs. 24 and 25. Age 7 years, 5 months. Date Feb. 4, 1924.

The maxillary incisors might be described by a lay person as very prettily arranged; examination reveals that not only are they in contact, but that they are crowded somewhat, as



shown by the rotation and overlapping. In addition, the left maxillary deciduous molars are buccal to the mandibular ones. Treatment was advised, but not undertaken.

Figs. 26 and 27. Age 10 years, 9 months. Date June 17, 1927, 3 years, 5 months later than models in Figs. 24 and 25.

No treatment has been undertaken. Severe crowding is now apparent to the layman in the maxillary incisor region; the labial occlusion of the laterals is severe. Mediodistally the molar occlusion is about the same, but it has improved buccolingually on the left side.

It seems to the writer that this is a case in which treatment at the earlier age—7 years 5 months—was markedly indicated; had it been undertaken the maxillary incisors would probably never have occupied the severe malpositions they are now in, if spaces large enough for them had been made before their eruption and the central incisors moved forward. The buccal occlusion of the left deciduous maxillary molars has partly corrected itself, and the buccolingual relation of the permanent molars is correct.

There have been appeals to delay treatment in case nature should rectify the condition; the writer entirely agrees with such a course where there seems a possibility or even a probability of this, but there are many others, such as the one shown, in which it would seem that nothing short of a miracle could bring about a good occlusion of the permanent teeth. Parents believe such a set of teeth as shown in the first models to be perfect, and there is a rude awakening when all the permanent incisors have erupted; the profession can, if it will, warn the parents of what may and often does happen, and then the responsibility rests with the latter (the parents) to prevent it by having treatment undertaken before the worst occurs.

A CASE OF SMALL APICAL BASE, TREATED WITHOUT EXTRACTION AND LATER
WITH EXTRACTION

CASE No. 751.—Class II, Division 1.

Figs. 28 and 29. Age 8 years, 9 months. Date Jan. 9, 1924.

Very narrow in maxillary lateral region, probably pathognomonic of a small apical base, a type of case the writer believes should be treated by extraction.

This case was treated for two years; the progress made is shown in Fig. 30. Age 10 years, 10 months. Date March 26, 1926.

At this time it was decided to extract $4|4$; the condition twenty-two months later is shown in Figs. 30 and 31. Age 12 years, 8 months. Date Jan. 16, 1928.



TREATMENT BY EXTRACTION ALONE; FAILURE OF THE TEETH TO OCCUPY THE
SPACES PROVIDED FOR THEM

CASE No. 1154.—Class I.

Fig. 31. Age 11 years, 3 months. Date June 29, 1926.

Treatment.— $\frac{2}{4} \frac{4}{4}$ extracted January, 1927.

Fig. 31. Age 12 years, 10 months. Date Jan. 3, 1928.

The space left for the right maxillary canine had closed before that tooth came into position, so that now it is necessary to remove the first right maxillary premolar, if it is desired to improve the alignment of the teeth in this region without treatment.

TREATMENT BY EXTRACTION

CASE No. 465.—Class I.

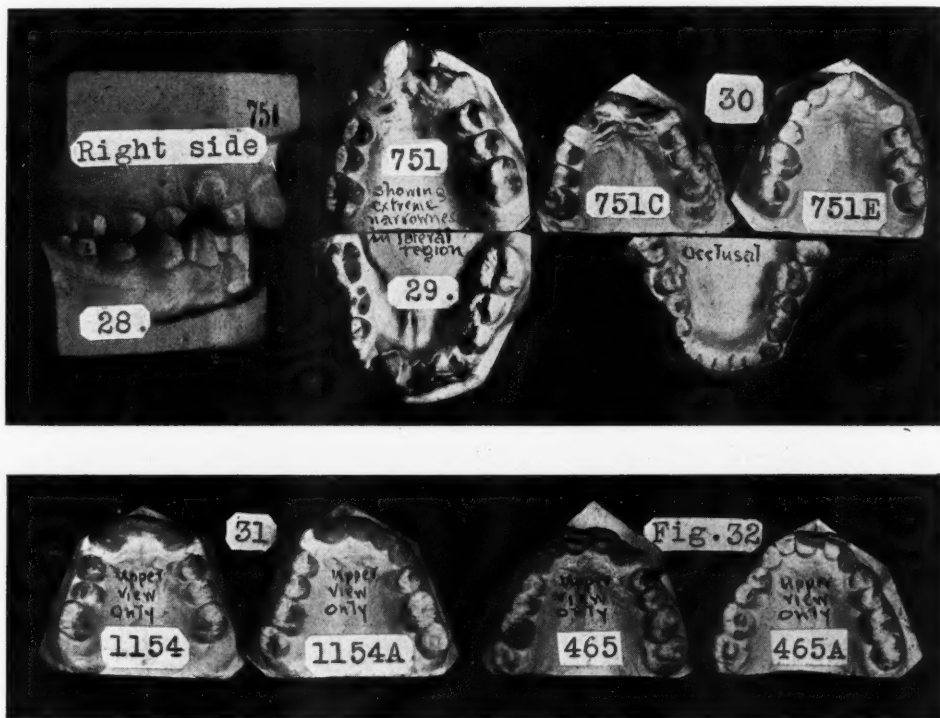
Fig. 32. Age 12 years, 11 months. Date Jan. 11, 1926.

Treatment.— $\frac{4}{6}$ extracted about January, 1926.

Fig. 32. Age 14 years, 11 months. Date Jan. 5, 1928.

While the canine has come into a satisfactory but yet still crowded position there is no improvement in the incisor region.

Case No. 1154 shows the necessity of holding back posterior teeth after removal of a tooth anterior to them in order that the canine may go into the position of the latter, instead of giving the back teeth the opportunity to move forward and occupy the space provided for the canine.



DISCUSSION

Mr. G. Northcroft said the President, having been the Society's curator for so long, would remember that in the museum there were models of the original cases that were first treated by Dr. Baker with intermaxillary traction, and the result of the treatment of those cases showed exactly the same end-result as Mr. Chapman had shown on the screen, the imbrication of the mandibular incisors being very marked. It had often been his experience that one saw a crumpling-up of the mandibular incisors, instead of the reversion to post-normality after correcting Class II cases.

In reply to a question by the President, as to whether he could furnish any reason for this, Mr. Northcroft said that like so many things in orthodontics, the reason, probably, was far to seek but he thought that it might be due to the bite on the maxillary incisors, pressing the mandibular incisors back, causing them to crumple up, the mandible remaining forward. But why the maxillary incisors should not go out in those cases instead of the mandibular incisors becoming imbricated, he did not know.

MANDIBULAR CYST ASSOCIATED WITH MALOCCLUSION

BY DR. G. M. ANDERSON, BALTIMORE, MD.

THOROUGH and accurate diagnosis is a prerequisite to successful treatment. The present means at our disposal make it more simple and still more sure, thereby greatly decreasing the chance for omission and mistake. In this case report involving a boy, age thirteen years, there was little, if any,

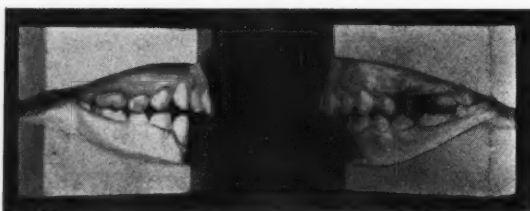


Fig. 1.—Right and left views of occlusal relations of posterior teeth.



Fig. 2.—Extraoral view of cystic area.

clinical evidence to warrant the supposition that a large cyst in the mandible was responsible for the existing malocclusion.

Mouth examination and a study of the casts of maxillary and mandibular arches show what is possibly a Class II, Division 1, subdivision Angle, with the mandibular right lateral in contact with the premolar and the canine to

the labial of these teeth (Fig. 1). Facial appearance was practically normal except for a slight inequality of the right side, mandibular third. Etiology was obscure.

In making a complete oral x-ray examination we were particularly careful to include the area of greatest malocclusion and facial disharmony. Use of the extraoral films revealed a large cyst (unilocular) between the roots of the mandibular right lateral and canine, somewhat similar in shape to a pineapple cheese (Figs. 2, 3). Patient reported no pain or discomfort of any sort but had always felt there was a slight swelling or puffiness of that particular



Fig. 3.—Dental film of area.



Fig. 4.—Dental film of area. Note inclination of roots, also bone regeneration.

part of the face. We did obtain the history of the mandibular right deciduous canine being abscessed and finally extracted several years previously.

The mandibular anterior teeth were vital when tested. The cyst was removed. The labial plate had been destroyed more than the lingual, in fact it was easily pierced by a sharp lance. Fortunately it was not necessary to remove any teeth.

Orthodontic treatment was delayed for a considerable period to permit bone regeneration. (Fig. 4.) Not only did this occur to a marked degree but an improvement in the position of the individual teeth was noted. Under such favorable conditions we feel that the case has now resolved itself into one of routine procedure.

AUTOMATIC APPLIANCES*

BY DR. GEORGE C. AINSWORTH, BOSTON, MASS.

THE invitation to speak to you this morning, advises as follows:

"We do not want a long paper—just a fifteen or twenty minute description of the Ainsworth anchorage, with its vertical tube, its labial arch and lingual anchorage: its purpose and advantages; also the same of the Inclined Plane Appliance.

"The principle of the vertical tube is generally accepted, but I find that the anchorage which you devised is not generally appreciated or utilized. The same applies to the principle of the Inclined Plane Appliance.

"In the latter, I feel it is because there is not a general comprehension of the necessity of the vertical growth and the reduction of the overbite in complicated cases of malocclusion."

This then involves the description of two separate appliances both of which are automatic, or self-acting, in accomplishing their design and require very little attention; this permits the absence of the patient from one to even four months, a matter sometimes of great convenience, as when the patient is away at school, on summer vacation or foreign travel; all of which many times may be arranged without detriment.

Both these appliances were fully described, illustrated and presented before the New York Stomatological Society in March, 1904, and published in the *International Dental Journal* of July, 1904.

Since then only slight changes have been made, the automatic or self-acting principle remains the same.

AUTOMATIC SPREADING APPLIANCE

A large percentage of cases presented for orthodontic treatment requires a spreading of the arch or arches, preliminary to the alignment of the teeth, and this appliance was designed primarily for that purpose. It also lends itself readily to the correction of certain other irregularities. That is, it can be so adjusted as to spread the arch and, when desirable, retract the incisors at the same time, or by the addition of ligatures the front teeth may be moved forward or elongated. In the first two it is entirely self-acting.

That you may better comprehend what I wish to convey, note Figs. 1, 2, and 3. This appliance, in its simplest form, is made up of three members—two anchors and a spring wire—while the compound appliance has four bands and two spring wires. In the former, each anchor is made up of three parts. The first is a piece of seamless tubing with 30 to 33 gauge walls of suitable size and length, to be fitted to the tooth chosen for anchorage, usually the first premolar, though occasionally the second premolar may be chosen. To this band is soldered on the palatal side and at a right angle to the band, a

*Read before the New York Society of Orthodontists at Boston, Mass., October 24, 1928.

piece of 18 gauge spring wire running along the border of the arch, with a bearing on and of sufficient length to engage all the teeth to be moved on that side; while on the buccal side of the anchor band is soldered a short piece of 18 gauge seamless tubing, vertically, that is, running parallel with the band to receive the ends of the spring wire, the active principle of the appliance. This wire may be inserted in either the upper or lower end of the tube, usually the lower.

TECHNIC OF MAKING THE APPLIANCE

When the anchor bands are nicely adjusted in place, a plaster impression is taken; and when removed, the bands are transferred from the teeth to the impression, slightly lined with wax and the model poured, passing through the usual technic. Then we have a plaster model, with the bands in place, precisely as they stand in the mouth; next, with a fissure bur we make a slight vertical channel on the buccal side of the anchor band, in order to locate better the small tube, which is designed to receive the ends of the labial spring wire. When this is done, the band from the model is removed, the tube is soldered in place, and the band is returned to the model.

Next, the adjustment of the palatal wire is made. The important point is to fit and adjust the anterior end of this wire so as to engage the cuspid above the bulge of enamel on the palatal side; otherwise when the force is applied to widen the arch, it will slide down the incline plane of the cuspid resulting in a lengthening of the premolar to which the band is attached, instead of widening the arch. The wire running along the palatal border of the arch is designed to move all the teeth engaged, as a unit and without resort to ligatures.

After this palatal wire is properly fitted, it is held exactly in place by small iron binding wire passed through the holes drilled in the model and then soldered to the anchor band *while on the model*.

This method results in an appliance which will fit in the mouth absolutely as designed—a matter of vital importance.

When completed it is usually desirable to adjust these anchors in the mouth without cementing for twenty-four hours in order that the cementing may be done with more accuracy and deliberation. The labial spring wire is fitted and adjusted in place at a subsequent sitting.

The first springs were made with the wire bent at a right angle to fit into the tubes, but it soon became apparent that an improvement could be made by giving it a U shape, thus providing for lengthening or shortening the wire as seems desirable.

ADVANTAGES OF THIS APPLIANCE

Among the advantages of this appliance is, first, its simplicity of construction; being simple, it is cleaner and not unsightly; being cemented on, it is worn twenty-four hours a day, a matter sometimes of much importance and resulting in more dependable efficiency. It interferes as little as seems possible with the ordinary functions of the teeth and mouth.

It is automatic in its action, therefore requires less attention, less inconvenience and pain, which should lend value to the service.

It is equally applicable to the maxillary or mandibular teeth, deciduous or permanent, and may be used on both maxillary and mandibular teeth simultaneously. But perhaps its greatest advantage is the ability with which by virtue of the vertical tubes, the ends of the spring wire may be bent to flare outward and so bring pressure to bear tending to widen the arches themselves without tipping the teeth.

After more than fifty years' experience, I know of nothing that will accomplish that part of the work, which this appliance is designed to accomplish, with so little attention, so little inconvenience to the patient, and so satisfactory a result.



Fig. 1.

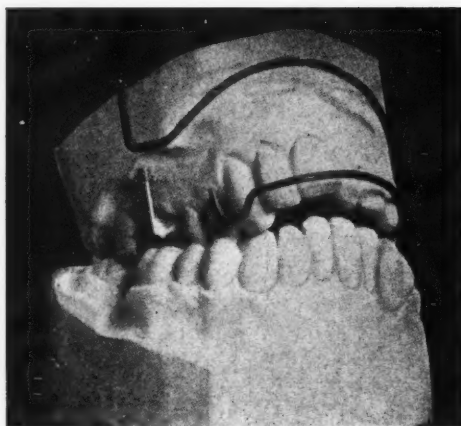


Fig. 2.

Fig. 1 shows a case of maxillary treatment; the appliance was put on May 12, 1928, and removed in September, with no intermediate attention.

INCLINED PLANE

The inclined plane is another appliance which is automatic in accomplishing its purpose.

It is designed to jump the bite and to aid in adjustment of the occlusion.

There are many cases in which there is a lack of vertical growth or development in the premolar and molar regions, and these are often accompanied with a distal occlusion of the mandible, causing a large overbite of the maxil-

lary incisors, giving an unpleasing expression to the lips and facial contour, and even causing the mandibular incisors to close up in contact with the rugae of the mouth.

Such cases formerly presented a very serious problem, and at times extraction of the maxillary premolars has been resorted to in an endeavor to improve the condition, that is, the distal occlusion of the mandible.

By the use of this appliance the treatment of such cases becomes very

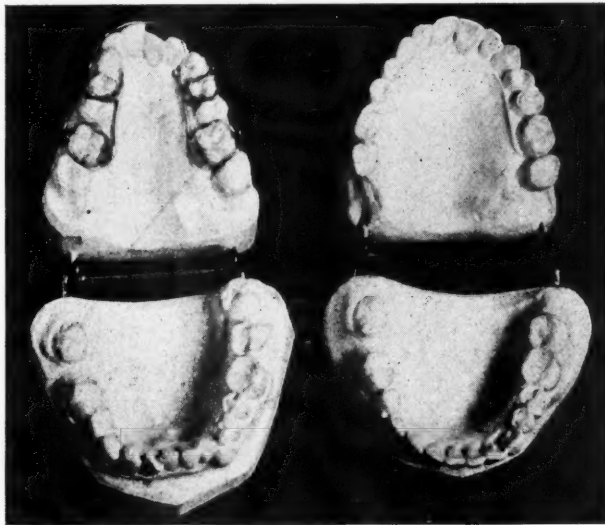


Fig. 3.

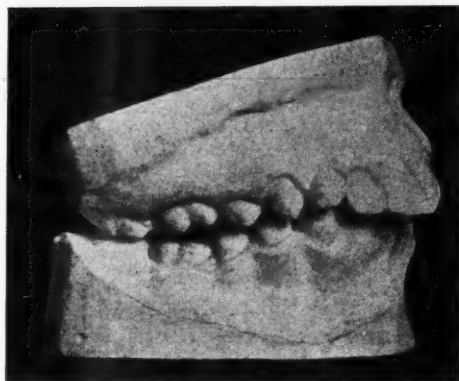


Fig. 4.

simple and when properly made and adjusted to place "carries on" to a most satisfactory conclusion, practically without any attention whatever from the operator.

The length of time required for such correction depends upon the age at which it is undertaken; usually at the time the bicuspid are erupting seems best.

The development of this appliance came about in this way:

A boy, perhaps fifteen years of age, was about to enter private school in a distant city, and it seemed impractical to see him again for some months; the

question was, Can anything be done in the two weeks' time before he leaves for school that will be of advantage?

The case was one with a considerable overbite and recession of the mandible, complicated with instanding right maxillary lateral incisor.

I regret that I cannot show you the pictures of this case before and after treatment. The models were loaned to some one a long time ago, and as far as I can make out, they were never returned; fortunately, however, I have pictures of a similar case, corrected at about the same time, more than a quarter of a century ago (Figs. 4, 5, 6, and 7).



Fig. 5.

Fig. 6.

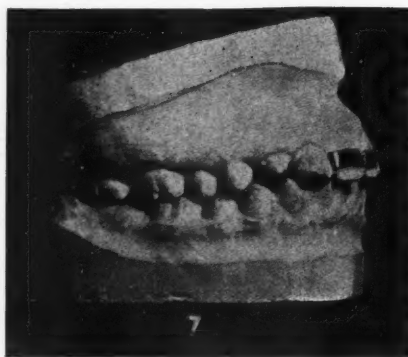


Fig. 7.

After a study of this case, I decided to make use of an inclined plane attached to the front teeth in such a way as to compel a correct closure mesio-distally (Fig. 5).

This appliance when firmly cemented in place presented a gold plate inclined surface attached to the maxillary incisors against which the mandibular front teeth in the act of closing must slide forward, to an approximately correct relation with the maxillary teeth, and leaving the occluding surfaces of the premolars and molars, maxillary to mandibular, separated nearly a quarter of an inch (Fig. 6). (These are not models of that particular case but one very similar.)

There was no possible way of bringing these teeth into contact in the act of closing; consequently, they were free to develop vertically until they should occlude according to Nature's design.

This appliance was adjusted in place at that time in the fall, and I did not see the patient again until the following June when to my great satisfaction, I found a most perfect occlusion of the molars and premolars (Fig. 7).

The only thing amiss was the slightly instanding maxillary lateral incisor which under usual conditions should have been put in place before applying the inclined plane.

You will notice that I made use of some little gold plate guards over the cutting edges of the lateral incisors in order to prevent too much depression of the centrals; small round wire hooks would be safer.

The plane may be attached to central incisors, lateral incisors or cuspids and may frequently be combined with a palatal wire running around the border of the arch and connecting with the bands on the molars, acting as a retaining appliance where the arch has been widened.

No doubt this appliance was suggested to me at that time by the knowledge of a similar device advocated by the late Dr. Kingsley of New York, which may be found illustrated in some of our older literature. His incline, however, was attached to a removable rubber plate and subject to removal by the patient at will, a most undesirable possibility.

And I would further say, that simultaneously with my making this appliance, Dr. W. S. Davenport of Paris, France, developed and used, as near as I understand, precisely the same thing—a not unparalleled coincidence.

I have described in brief these appliances but have intended to cover the main features or high points. If I have failed to convey a clear understanding I shall be glad to clear up any points in answer to questions either now or through correspondence, and if any of you can find the satisfaction in their use that I have had, I shall feel fully repaid in the pleasure and honor I have had in presenting them.

DEPARTMENT OF ORAL SURGERY, ORAL PATHOLOGY AND SURGICAL ORTHODONTIA

Under Editorial Supervision of

Sterling V. Mead, D.D.S., Washington, D.C., Director

M. N. Federspiel, D.D.S., M.D., F.A.C.S., Milwaukee.—Vilray P. Blair, M.D., F.A.C.S., St. Louis, Mo.—Theodor Blum, D.D.S., M.D., F.A.C.D., New York.—Leroy M. S. Miner, M.D., D.M.D., Boston.—Wm. L. Shearer, M.D., D.D.S., Omaha.—Frederick F. Molt, D.D.S., Chicago.—Robert H. Ivy, M.D., D.D.S., Philadelphia.—Edward L. Miloslavich, M.D., Milwaukee.—French K. Hansel, M.D., M.S., St. Louis, Mo.—W. M. Reppeto, D.D.S., Dallas, Texas

SWITCHING OF VERMILION-BORDERED LIP FLAPS*

BY J. B. BROWN, M.D., ST. LOUIS, MO.

FOLLOWING are some adaptations of the plan of the switching of vermilion-bordered lip flaps for improving balance after removal or loss from either lip. The blood supply through the coronary vessels makes it possible to turn such a flap on an extremely narrow pedicle. This is useful in patients with small lesions on the lip where, following a V-excision, there would be too much difference in the width of the lips if the defect were closed simply by suturing. With the flap available, there is not much tendency to cut too close to the growth, and because of the simplicity of the technic, there cannot be much real argument against the excision of these growths, especially those that have had prolonged and many different kinds of treatment or unknown amounts of radiation. By this method the whole specimen is obtained for microscopic diagnosis without much more trouble than in doing a biopsy (Figs. 1 and 2). Accumulated observation has led to the conclusion that all cases of suspected or clinically diagnosed malignancy should have the benefit of microscopic examination of the tissue, even if radium or any other destructive agent is to be used. If large sections of the lower lip are removed an upper lip flap may be used in combination with other flaps (Figs. 2 and 3). The flaps may be advantageously utilized on patients with defects following former operations for growths, injuries, or disease; and in some reoperations for cleft lip (Fig. 4).

If the defect is near the angle on the lower lip, a triangle can be swung directly down from the upper, preserving the coronary vessels in a mucous flap. In this instance, the pedicle of the flap will form the new angle of the mouth (Figs. 1, 2, 3). The upper lip defect is closed by pulling the lip over to the cheek with any further adjustments necessary to lessen the distortion about the

*From the clinic of Vilray Papin Blair.

Reprinted from *Surgery, Gynecology and Obstetrics*, 46: 701, 1928.

nose and upper part of the lip. The corner of the mouth is put in the best obtainable position, but this may be improved if necessary by some subsequent operation (Figs. 1, C, 3, B and C). The suturing should insure contact for the full depth of the wound (Figs. 1 and 2).

If the defect is near the middle of the lower lip, the remaining lateral portion may be raised as a somewhat rectangular flap and swung across to fill in the center. The defect at the side of the lip can then be filled in with a flap from the upper (Fig. 2).

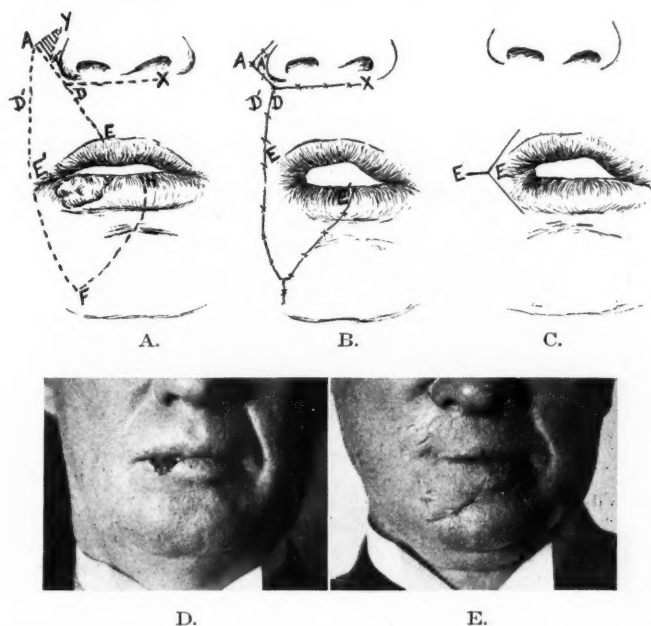


Fig. 1.—Plan 1. Large removal from lower lip repaired by large triangular flap from upper lip that permitted immediate adjustment of the remaining part of upper lip to give the corner of the mouth the proper vertical level and not distort the nostril. A shows plan of cuts and excision. $E'FH$, excised portion of lower lip; $E'EA$, triangular flap raised for filling in lower lip defect; DX , relaxation cut through full thickness of lip. $A'AY$, adjustment cuts, and this triangle discarded. B, immediate adjustment, DE is moved over to the right aided by relaxation along DX . The line AD' in A has been pulled in so that its midportion occupies a place about where D was before the transfer; E' that was at the angle in the upper lip has been swung down around into position near the middle of the lower lip. E forms the new angle of the mouth. Stay sutures through the full thickness of the lip and cheek may be put in across the line DE to relieve tension on the blood supply. C, plans of Y cuts for V-adjustment to shift new corner outward. This step is done at a later time to allow freer opening. Y -incision made and E is dropped back to E'' and the incision closed in a V. D, condition for which Plan 1 is used. E, Final result.

For the swinging of a flap from the lower lip into the upper lip at or near the center, the pedicle must of course go across from one lip to the other and remain there until the flap has established its new blood supply. The pedicle is cut usually between 2 and 3 weeks, and before cutting it the new blood supply is tested by compressing the pedicle with a rubber-covered clamp for an hour or two (Fig. 4, H). If, after several hours of compression, repeated on several consecutive days, the color of the flap, while the pedicle is compressed, remains doubtful, it may be well to divide the coronary artery in the flap; but postpone the cutting of the rest of the flap until the new circulation is satisfactory. A flap switched into a scar bed may be slow in gathering its new blood supply. This compression should be gentle to avoid cumulative trauma. A plaster cap

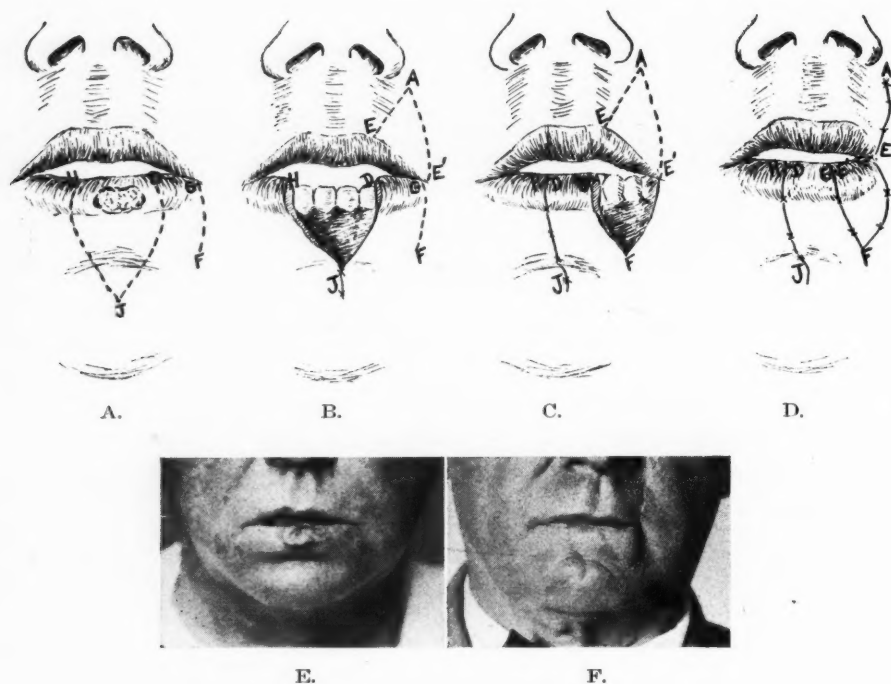
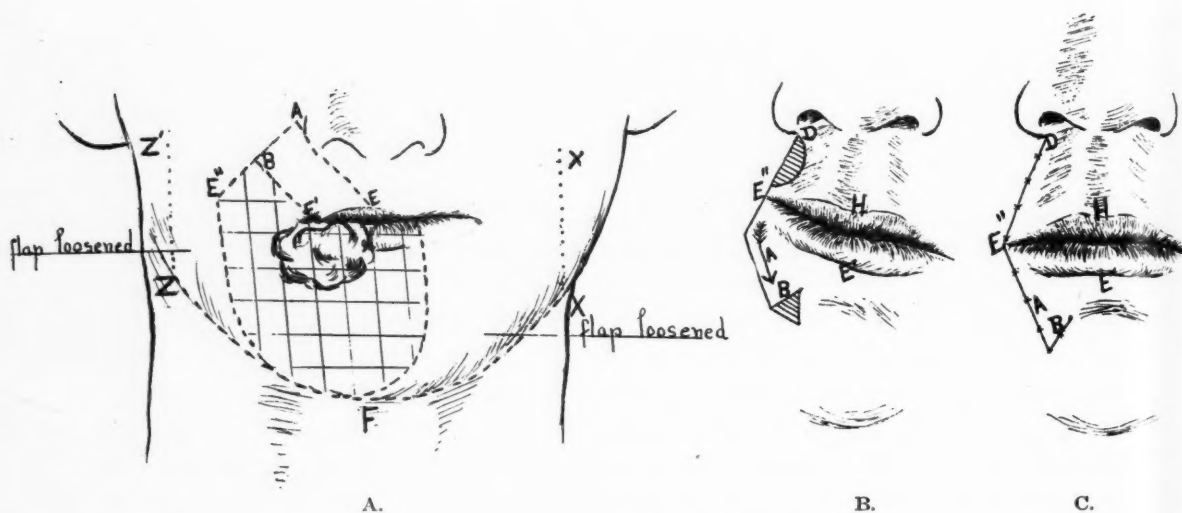


Fig. 2.—Plan 2. Central defect of lower lip closed by a lateral flap from the same lip and the resultant lateral defect by a triangle from the upper lip. A shows *HDJ*, excision. *DJFG*, rectangular flap raised to fill in central defect. B shows *EAE'*, triangular flap raised to be transferred into defect in lower lip when *DJFG* is transferred to center. C shows the lateral flap transferred to the center. D shows the completed operation with the triangular transfer from the upper lip in place in the lower. The defect in the upper lip is closed by sutures without further adjustment, and the result is final. The transfer of this triangular flap is the simplest of the procedures, and it can be used, usually without further adjustments, when there are only small lower lip defects at the corner to be filled in. E shows condition for which Plan 2 is used. F, final result.

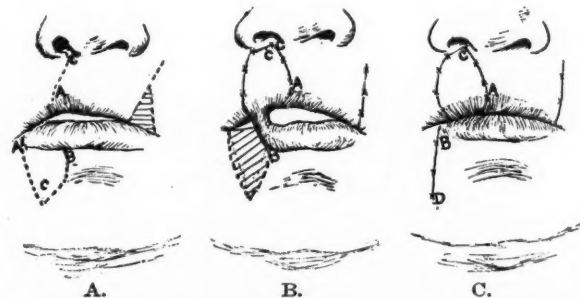




D.

E.

Fig. 3.—Plan 3. Wide excision from lower lip, chin, and cheek; small excision from upper lip. Defect closed by cheek and chin flaps supplemented by a rectangular flap from the upper lip. A, The cross-checked area indicates the area excised. $EE'BA$, flap to be switched into defect. XFZ is a relaxation cut just superficial to the body of the jaw extending into the mouth; the buccal mucous membrane being also cut upward just in front of the ramus, ZZ' and XX' . The borders of the lower part of the defect are drawn together after swinging the flap $EE'AB$ on the pedicle at E , and the upper lip is closed by approximating AE'' and AE . B shows result obtained by first operation, which was further corrected as shown in B and C. The excision between D and E'' lengthened the upper lip. The triangle excised at B gave space for lowering flap. Then the corner of the mouth with the flap was rotated downward on an axis $E''H$, with H as a center of rotation along the cut $DE''B$. C shows final result with fairly straight mouth. D and E show patient on whom excision and restoration was made according to Plan 3.



A.

B.

C.



D.

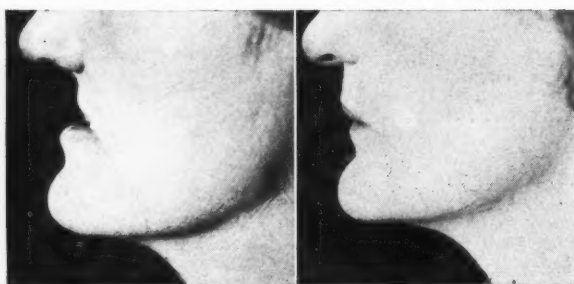
E.

Fig. 4.—Plan 4. Used for filling in defects of the upper lip at or close to the center. A, $A'C'$ line of opening lip to receive flap. ABC , flap raised in lower lip. The shaded triangle at the left corner of the upper lip is removed and the defect resutured to correct the deformity shown in D. B, flap ABC in place in upper lip with the pedicle still attached to the lower lip at B , through which the blood supply goes. This pedicle is cut in from 2 to 3 weeks, after the vitality of the flap is tested by clamping the blood supply through the pedicle. Further adjustment of the vermilion of both lips is necessary but may be delayed for some time after the pedicle is cut if advisable. The defect in the lower lip is left open in this drawing to show the course of the pedicle. C, pedicle of flap has been cut and the vermilion of both lips adjusted. BD , line of closure in lower lip. D and E show a condition for which Plan 4 is used.

with a padded plaster sling down around the chin is the plan used for holding the mouth closed to prevent damage to the pedicle (Fig. 4, I).

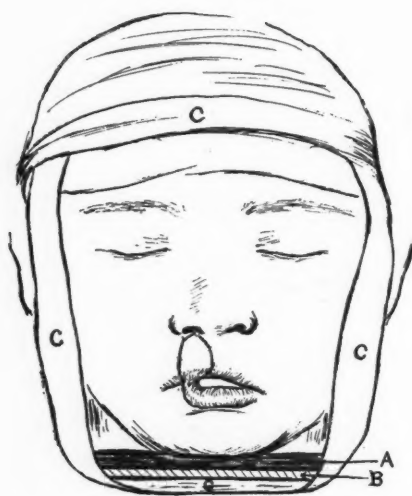
The area to be excised or to be filled in and the flaps used for repair are to be carefully planned. Accuracy in this point will be evidenced in the result. The blood supply of the flap must be kept in mind while the flap is being cut, as the pedicle consists of but little more than the vermilion border and the coronary vessels. The artery can be felt just under the mucous membrane.

There is seldom much trouble with function, although there may occasionally be some leakage of fluids because of lack of sensation or of muscular action.

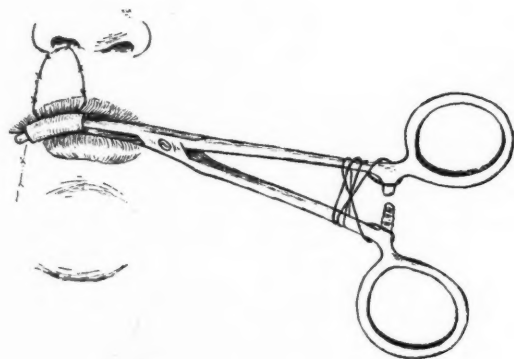


F.

G.



I.



H.

Fig. 4—Cont'd

F and G, same as views C and D. H shows methods of gently compressing the pedicle to shut off the vessels through it to the flap. This is to determine the adequacy of the blood supply from the new bed of the flap, and it is started about the tenth day. A rubber-covered clamp is used, and a rubber band is looped over the handles to obtain even elastic pressure. The catches on the clamp are used to hold the rubber band. I shows method of holding the mouth shut. The head is padded and a plaster cap is put on that holds the plaster sling from the chin. This has been found to be the most comfortable arrangement, although a silkworm gut stitch from one lip to the other, that does not interfere with the blood supply, has been used satisfactorily.

With a little training this can usually be overcome. The patient should put his spoon or cup against the lower lip at the repaired angle and take the food in from there. This same method proves of value to those patients who have lost the inframandibular branch of the seventh nerve from other causes. Most of the patients operated on have satisfactory control of the mouth, and none of

them has any leakage of saliva. More accurate data is being collected on the nerve regeneration and muscular action.

In general, this plan tends rather satisfactorily to preserve some of the natural prominence and contour of the damaged lip and to prevent the excessive protrusion of its fellow that results from the obliteration of the original defect by the simple approximation of the borders.

REFERENCES

Abbe, R.: M. Rec., April 2, 1898.

Buck, Gurdon: Reparative Surgery, 1876.

Estlander, J. A.: Rev. mem. méd. et chir., p. 344, 1877. (Quoted by J. S. Davis: Plastic Surgery.)

CHIEF FUNCTION OF NASMYTH'S MEMBRANE

BY DR. WILLIAM L. SHEARER, OMAHA, NEB.

SO FAR as I know articles on Nasmyth's membrane have been written and reported from time to time. In these articles Nasmyth's membrane has been given no particular function and has been reported by many as having no function.

Nasmyth's membrane has a definite function. It acts similar to the bag of waters in the birth of a child. The bag of waters dilates the canal and the head is born. This same thing is true of the Nasmyth's membrane. By pressure of the membrane against the bone it absorbs the bone and gives birth to the crown of the tooth, and the tooth is born or erupted into the mouth. This, in reality, is its important function. While it has other functions, this is the major one.

FRACTURES OF THE MAXILLA AND MANDIBLE

BY DUNCAN MACMILLAN, JR., D.D.S., NEW YORK, N. Y.

Instructor, Oral Surgery Dept., N. Y. U. College of Dentistry; Head of Dept. of Oral Surgery, St. Mark's Hospital, N. Y. City; Assistant Visiting Dentist, Kings County Hospital, Brooklyn, N. Y.

IN TAKING up the subject of fractures of the maxilla and mandible, probably the first thing to consider is the cause.

We find that the great majority of cases are due to trauma, such as blows on the face, excessive stress used in the extraction of teeth, accidents (automobile, train, falling, etc.) and gunshot wounds. There are some cases due to pathologic conditions such as growths, which sometimes cause a necrosis of the part thereby causing a fracture, and conditions of osteomyelitis with the bone decomposing and causing a fracture.

The mandible is the most frequently fractured bone of the face.

CLASSIFICATION OF FRACTURES

Fractures may be:

1. Simple.—No communication between the bone and air. Either oblique or transverse.
2. Compound.—Where there is communication with the air and injury to the surrounding tissue.
3. Multiple.—Where we have more than one line of fracture.
4. Comminuted.—Where we have a splintering of the bone, and the bone is broken into small pieces.
5. Impacted.—Where one end of the broken bone is driven under the other end.
6. Green Stick.—Where the fracture is not complete.
7. Complicated.—Where we have injury to the nerves, dislocation or other serious symptoms connected with the fracture.

SYMPTOMS AND DIAGNOSIS OF FRACTURES OF THE MAXILLAE

The subjective symptoms are few. The patient will complain of tenderness of the part and pain, and this increases upon the moving of the jaws. There is also a loss of function, and we take the history of the patient.

The objective symptoms are more numerous. In the majority of cases we notice a swelling of the area, or marks of violence may be present. If you instruct the patient to bite the end of a tongue depressor, you will find that the function of biting is greatly reduced, and this will give him increased pain. There are also cases in which extreme violence has taken place; where the patient has lapsed into a coma, and where fractures of the maxillae are sometimes accompanied by fractures of the base of the skull. It is always advisable, if the patient has lapsed into a coma, to examine for a fracture of the skull.

The use of the crepitation method may also suggest that a fracture is present. This is accomplished by holding both ends of the suspected fracture and moving them in opposite directions. A grating noise will be heard which is due to the fractured ends rubbing against each other. In many cases the fracture may be so extreme as to make itself manifest without examining for these other symptoms, as will be found in the case of compound fractures which penetrate directly through the mucous membrane or the outer skin. Even with all of these symptoms present, we should resort to our x-ray method of diagnosis. X-ray plates should be taken, one of either side of the face, and so placed as to show the coronoid and condyloid processes, and an anteroposterior plate. If we have found by the other symptoms that a fracture is present in the region of the symphysis or mental foramen, we may also have a fracture of the ramus or of either the condyloid or coronoid processes; so we should, therefore, base our complete diagnosis on the findings of the x-ray films.

METHOD OF TREATMENT FOR THE REDUCING OF THE FRACTURE

Whether the fracture be of the maxilla or mandible, we should first take our x-ray pictures. As described above, we should take a lateral plate of either side and an anteroposterior plate so that we may examine for a possible fracture in the anterior portions of these bones. We may find that there is a tooth in the line of fracture, we should then decide whether to remove this tooth or not. If there is the possibility that this tooth will cause trouble or retard the union of the parts, this tooth should be removed. If, however, we intend to use this tooth in the coaptation of the parts and for the holding of our splints, we should leave this tooth in position, providing it will cause no ill effects or at least until we have a fibrous union present. The next step is to cause a coaptation of the parts. In coaptating these parts we are liable to cause considerable pain to the patient; and if there are no contraindications, conduction anesthesia should be resorted to. In other cases, general anesthesia is indicated, especially where we have considerable edema and the presence of pus, which in some cases causes lockjaw. Cases of this nature with the use of general anesthesia (N_2O) have been successfully demonstrated.

Probably the best splint which can be used in almost every case of fracture is a wire splint, 18 carat gold casing with loops attached and used in conjunction with ligature wire to hold the splint in place, and rubber bands to hold the jaws immobile in the use of an interdental splint. This appliance may also be used as a single arch appliance where the fracture being treated does not call for an interdental splint. Splints of this nature can be obtained in sufficient length to take care of almost any size arch. We first take the splint and get the correct length for the individual arch we are treating, and cut off any excess length which may be present. We then adapt the splint to conform to the depressions and curves of the arches, taking care in our adaptation not to encroach upon the soft tissues and have the loops of the splints pointing toward the roots of the teeth in the individual arch. After we have them adapted, we select the teeth which we are going to use for our supports and adapt our ligature wire around them, leaving the ends open on the buccal side.

Usually five or six teeth in each arch are sufficient as supports. Our ligature wire (doubled) is passed interproximally and around the lingual side of the teeth. This is done by folding our wire in half; and instead of using instruments or pliers, if we pass some dental floss through the loop end and force the dental floss between the teeth, it will be very easy to draw our wires interproximally. After we have the wires in position, we take the splint adapted for the arch which is not affected, and securely wire it to the arch with one end of the ligature wire over and one end under the splint. We then twist our wires tightly, cut off the excess ends of the wires and fold the remaining portion down so as not to interfere with the lips or other soft structures. Instruct the patient to close and force the fractured portions back into normal occlusion and securely wire the other splint to the fractured member. This will hold the parts firmly in position. We then take rubber bands or wire (rubber bands preferably) and fasten them from one arch to the other by attaching them to the loops on the splints. This will overcome any muscle interference and hold the parts in coaptation and immobile. If the wires have to be tightened later for any reason, it is a very simple matter to slip the rubber bands off, make our adjustments, and attach new rubber bands. These appliances should be left in position until fibrous bony union has taken place. If no complications develop, fibrous bony union will usually take place in from four to six weeks at which time we may remove the splints. We also have several other methods of reducing the fractures, such as the use of interdental wiring (wiring from the teeth of one arch to the teeth of the opposite arch), the use of vulcanite dentures for holding the arches immobile, the use of the Kingsley splint, Angle fracture bands, etc. To describe the way in which each of these methods is used would defeat the purpose of this article, which is to give a short and concise method of treatment. The other methods may be described in articles pertaining only to their individual uses.

CARE OF FRACTURE CASES

The patient should be instructed to rinse the mouth frequently (especially after eating) with a good antiseptic mouth wash and to try to remove as much food debris as possible. The patient should visit the surgeon every two or three days so that the case may be watched, splints adjusted if necessary, the mouth irrigated, and also to change the rubber bands as they may become quite odorous or lose their elasticity after having been in the mouth for some time. The patient should be placed on a liquid diet.

COMPLICATIONS WHICH MAY ARISE IN FRACTURES OF THE MAXILLAE

Hemorrhage may result from the rupture of the internal maxillary artery or its branches and may cause fatal results. Such cases of hemorrhage are not easily controlled and do not readily respond to treatment. In such cases the prognosis is not favorable. Rupture of the infraorbital nerves, paralysis of the palate (due to a lesion of the anterior palatine nerves), meningitis, septicemia, pyemia and in rare cases tetanus may complicate fractures of the maxillae. Severe cases may present fractures of the skull and concussion of the brain. The teeth themselves may lose their vitality due to the shock of the

blow causing the fracture and set up dentoalveolar abscesses. The pus from these abscesses may flow to the point of the fracture and interfere with the healing, and necrosis of the bone will set in unless these teeth are removed or are opened up and the pulp chambers and canals cleaned out, sterilized and properly filled. Cases of neuralgia have been known to develop as an aftermath of a fracture. This is probably due to the nerve endings catching in cicatricial tissue (scar tissue).

COMPLICATIONS WHICH MAY ARISE FROM FRACTURES OF THE MANDIBLE

Probably one of the most frequent complications in fractures of the mandible is osteomyelitis. In this case we get considerable swelling of the surrounding tissue, and considerable pain is suffered by the patient. The main procedure in osteomyelitis is to establish drainage and irrigation. We must try to establish drainage first from the inside of the mouth, and if this fails to clear up the case, it is very often necessary to make an external incision. In cases of this type (osteomyelitis) we notice that there are islands of bone present. These spiculae of bone will continue to suppurate and interfere with the healing of our case until they are removed. Care should be taken in their removal, so as not to injure any newly formed structures which may be present. Normal saline solution may be used for irrigation of the wound. Considerable success has been attained by the use of sodium thiosulphate (dram to the ounce) in irrigating the wound, as this solution seems to have the property of throwing off these islands of bone without injury to the rest of the tissue.

Another complication which may be present may be due to a rupture of the dental artery, in which case this may be controlled by packing the wound with sterile gauze.

As in the case of fractures of the maxilla, the teeth may lose their vitality due to the trauma and should be treated in the same manner as described above. We may also have the complication of nonunion or a sticky or gummy union; however, these are exceedingly rare and if all infection has been cleared up we may look for some other cause, possibly syphilis or carcinoma.

In the writing of this article, it has been the author's intention to present a short and concise method in the treatment of these cases and no attempt has been made to elaborate on any particular step but to present each step as it occurs, namely, cause, classification, symptoms and diagnosis, treatment, care, and complications.

DEPARTMENT OF DENTAL AND ORAL RADIOGRAPHY

Edited By
Clarence O. Simpson, M.D., D.D.S., F.A.C.D.,
and Howard R. Raper, D.D.S., F.A.C.D.

RADIODONTIC NOMENCLATURE

BY DR. CLARENCE O. SIMPSON, ST. LOUIS, MO.

UNIFORM nomenclature promotes facility and accuracy of expression and denotes progress in an art or science. Precision is desirable in formulating nomenclature, but after it is established, changes cannot be accomplished without difficulty and confusion. Consideration and caution should be exercised in coining technical and scientific terms, and sound judgment should prevail in attempting to change them. The English language abounds in misnomers, ambiguities, and inaccuracies which have been established by usage. These may be avoided by purists, but no one would have the temerity to attempt their correction.

The terminology of dentistry is not exact in its entirety and does not correspond with that of other biologic sciences in some instances, but it is commendable for a young science of hybrid and polyglot origin. The early development of specialties in dentistry has focused attention upon nomenclature and stimulated its adoption. Unfortunately, radiodontia has not attracted the numerical strength in specialists to control either the terminology or the legal restrictions of practice. The lack of attraction is not in possibilities of service but in probability of compensation. This condition exists because most patients cannot and most dentists will not discriminate in radiodontic service.

Shortly after the discovery of the x-rays the term "radiograph" was generally adopted for the picture produced by the rays and also the act of producing it. "Radiography" was the name applied to the practice, and "radiographic" was the descriptive adjective. This nomenclature was etymologically acceptable, although it combined the Latin *radius* meaning ray with the Greek *graphein* meaning to write.

About 1914 there were sporadic attempts to substitute "radiogram" as the term for an x-ray picture to avoid using the word "radiograph" as both a noun and a verb. This was unnecessary since thousands of words, notably among them "photograph," had served in the dual capacity without objection or complication. Quite properly, the proposed correction failed, because ten

years previously the word "radiogram" had been adopted as the name for a wireless message. The connection permits of no misunderstanding in the use of "radiograph" as a noun and a verb, but the more common and earlier use of "radiogram" in wireless transmission would have been confusing. The reformers who advocated "radiogram" were most inconsistent in using "radiographic" instead of "radiogramic" for the adjective and interpreting the radiographic evidence of a radiogram.

The influences which led to the organization of the American Roentgen Ray Society introduced the roentgen nomenclature with such monstrosities as roentgenologist, which implies one having special knowledge of Professor Roentgen. The principles of philology admit the use of a person's name to identify a thing, for example Stenson's duct, but not as a basic stem for nomenclature. The permissible exceptions are the suffixes "ian" as the adjective form and "ism" as the theory or principles, for example Darwinian and Darwinism. Thus, the term "Roentgen rays" conforms to the rule, but "roentgenology" and "roentgenograph" do not. An amusing impediment in the roentgen terminology is that it cannot be combined with "odontia" for dental application because roentgenodontia would mean Professor Roentgen's teeth.

As might be expected, the American Medical Association eagerly adopted the roentgen nomenclature. Persisting from the period of the medicine man and priest who retained their power by superstition and mystery, the medical profession dotes on long, complex words and pompous communication. Prescriptions are written in Latin, so the patient will not know what is being taken because the doctor may not know why it is being given, and blissful honors are even.

A significant feature of the situation is that the Radiological Society of North America, the representative organization of radiologists in number and radiologic progress, has not adopted the roentgen terminology. The founders of the Society were not in sympathy with the mongrel nomenclature reform; there has been no logical reason for a change of sentiment, and *Radiology*, the official organ, is widely distributed as a monument to American achievement in the science and simple terminology. Likewise, the men who were foremost in developing radiodontia, Kells, Van Woert, Raper, Ottolengui, Satterly, and McCoy, did not accept the roentgen nomenclature. Characteristic of those who appropriate and exploit the work of other men, the imitators desire more impressive words for the science to which they have contributed nothing. Peculiarly and possibly because they concentrate upon nomenclature, roentgenologists do not become proficient in radiodontia.

Presumably to ape the American Medical Association, the *Journal of the American Dental Association* several years ago went roentgen. This probably occurred through too much authority being delegated to an officious copy editor, because the Journal editor at that time did not have rabid opinions on the subject. Upon request, it was possible to have the radiologic terminology retained in articles published in the Journal until last year. Then the permission was refused and the request resented.

It is the privilege of an editor to use any nomenclature or literary style

which his readers will tolerate, but it is not his prerogative to compel contributors to use the same. It is surely not editorial courtesy to mutilate manuscripts even to the extent of changing the titles by substituting terms of the editor's choice for words which are recognized by standard dictionaries. This abuse of assumed editorial autocracy is particularly flagrant in a journal published by a democratic organization as a means of communication between its members.

Since the Nomenclature Committee of the American Dental Association lists the radiologic terminology as optional and probably 99 per cent of the Association's members use it, it should be permissible to publish it in the *Journal*. There are variations of terminology in other branches of dentistry, but contributors are allowed to publish those of their preference in the *Journal*. Although the roentgen terms have been arbitrarily forced upon dentists for years, they are usually mispronounced, and often "rentjin" is the pronunciation used by those who would affect them. The inconsistency reaches its peak of absurdity after articles have been translated for the *Journal*, when "roentgenographic" and "radiodontic" appear in the same sentence. The American Dental Association does not have a reputation for honoring its scientists, but it might refrain from dishonoring the pioneers in radiodontia (which is generally credited with revolutionizing dental practice) by suppressing their terminology.

To replace the unwieldy name "dental radiography and diagnosis" which was used to designate the branch of the practice, Raper in 1915 suggested radiodontia. The definition given for radiodontia was the art and science of making and interpreting radiographs of the teeth and contiguous structures. "Radiodontist" as the name of one who practices the specialty and "radiodontic" as the adjective are accepted by most English-speaking dentists. The greatest advantage of the radiodontic terminology is its precision without the necessity of the qualifying word "dental" or "oral." "Radiodontic" specifically refers to oral radiography. "Radiography" is a general term for the making of radiographs of any part of the body or of materials for industrial purposes. "Radiology" is far more extensive in being the science of radiant energy including fluoroscopic diagnosis and the therapeutic use of radium and of the x-rays.

Ottolengui coined the terms "radiopaque" to describe substances which are not penetrated by the rays, "radiolucent" for those which are penetrated, and "radioparent" for those which offer no evident resistance to the rays. Although these words are indefinite in their application, they are useful in eliminating the necessity of describing variations in radiability, as light or dark areas. "Radiopaque" and "radioparent" are literally definite, but "radiolucent" offers a wide range of modification. The most common use of "radiolucent" is to describe the radiographic appearance of periapical destruction, yet the bone and teeth are not radiopaque and the gums are not radioparent. Therefore, "radiopaque" and "radiolucent" signify greater or less resistance to radiation than normal or than the adjacent structures, and "radioparent" has a limited application to the tissues which do not register images.

An objectionable terminology is the misuse of "x-ray" for everything pertaining to radiodontia. Dentists and physicians are inclined to speak of buying an x-ray when they mean an x-ray machine, or looking at an x-ray when they mean an x-ray picture, or charging for an x-ray when they mean an x-ray examination. The x-rays are not distinguishable by any of the special senses, and they cannot be isolated. Therefore, it is a mistake to use the singular noun, as in the sentence, "The x-ray penetrates bone," which should be, "The x-rays penetrate bone." Doctors are greater offenders than the laity in misusing the singular form, and one rarely hears the word "x-rays" except in reference to a group of radiographs where it is incorrect. Furthermore, "x-ray" is not a verb, and there is no grammatical authority for speaking of "x-raying the teeth." The only accredited form of "x-ray" is the adjective, as an x-ray burn or x-ray tube.

Since the same character of rays can be used for other purposes, there is no qualification which justifies the term "dental x-rays." There are dental radiographs and dental x-ray machines, but a sign reading "dental x-ray" is meaningless, incorrect—and unprofessional. Incidentally, the dentist who has "x-ray" on his door or window is advertising a special method of practice to attract patients in violation of the Code of Ethics.

It is permissible to call a radiograph a "film," although it was a film before it was exposed and may not be much more afterward, but there should be capital punishment for pronouncing it "fillum."

Newspapers universally capitalize the "x" in "x-rays" without any reason except that it is done in some dictionaries. In dental and medical publications, this has long since been generally discarded, and it was surprising to find that the capital "X" had been injected throughout an article recently contributed to *The Dental Surgeon*. None of the rules for capitalization apply to x-rays, and there is no more reason for this distinction than to capitalize violet rays or sun rays. Other than the impropriety of it, the chief objection is the annoying prominence of the capital "X" in type. The "x" representing an unknown quantity in mathematics, which was the origin of the name for the rays, is italicized, so anyone who wishes to be punctilious may use the italic "x," but there are many refinements in radiodontia more urgent.

ABSTRACT OF CURRENT LITERATURE

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA
DENTAL RADIOGRAPHY

BY DR. EDWARD PREBLE, NEW YORK CITY

NUTRITION AND PEDIATRICS

BY SAMUEL ADAMS COHEN, M.D., NEW YORK CITY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

Orthodontia, Oral Surgery, Surgical Orthodontia, and Dental Radiography

Oral Sepsis in Germany. E. Dickmann (Burg, near Magdeburg). Zahn-ärztliche Rundschau 39: 4, 1930.

The problem of oral sepsis which appears to have been settled in the affirmative in America has made little headway in Germany as an extensive factor in the general communal health. German physicians prefer to regard all lesions as purely local. Rheumatic affections are given purely local treatment with results apparently satisfactory, while the German dentists explain away the alleged brilliant results of extraction on remote affections and are in the habit of sending their patients to the physicians for any troubles outside their own province. It is thus far impossible to show exact proofs that diseased teeth can cause a multitude of remote affections—such a connection cannot be proved up to the hilt. There is of course a dental sepsis which can cause metastases in distant organs, but this is a very different thing from so-called focal infection. At the same time cases occur in practice which suggest that now and then infected teeth may be responsible for a group of neuralgiform and rheumatoid affections. The simplest of these comprise facial and occipital neuralgias, but it has long been known that diseased teeth may be responsible here. However, these patients may also complain of a series of other ailments remote from the cranial nerve distribution, and these may improve with the neuralgias, etc., following extraction. There may be symptoms referred to the stomach and heart, for example. Of six cases cited by the author all but one suffered chiefly from neuralgia of the head or face. The exception complained of rheumatic pains through most of his musculature, including the feet. Extraction of infected teeth was followed by complete subsidence of the symptoms, and bad weather did not cause any return of the same. Aside from disappearance of the painful symptoms there was no permanent benefit to the general health.

Failure of Dentists to Make Routine Use of Roentgenography. Editorial in *Pacific Dent. Gaz.* **38**: 2, 1930.

The general impression has been that the diagnostic use of the x-rays has been definitely adopted by all dentists, and this has been the opinion of Dr. Endelmann, the editor of the *Gazette*, but a contribution in a recent issue of *Dental Items of Interest* seems to have undeceived him in this respect. As a matter of fact, it is found that only a relatively small percentage of dentists makes habitual use of this resource, and a large number must actually feel that they can practice successfully without it. The art of radiography has several important expressions in addition to diagnosis which serve to check up the results of operations and even of inlays and fillings. The disinclination to make use of these advantages is undeniable but difficult of explanation. A dental examination without radiograms is really no examination at all. The radiographer is constantly enlarging his field for routine work, and recently Dr. Howard Raper has stressed the need of interproximal films for the diagnosis of caries, which are already regarded by many dentists as indispensable for the recognition of early caries. The same author's advocacy of a large series of periapical films—fourteen to be exact—has long been known, and the two methods should be combined in the routine examination. A matter which the editor does not mention is the possible risk of damage suits for failure to make use of diagnostic radiography. When the rays were comparatively new, not a few surgeons were compelled to pay damages for failure to use radiography in connection with actual or presumptive fracture of bones, and failure of the average dentist to make use of the rays might expose him to the dangers not only of legitimate claims for damages but of other claims not so well founded. The defence of the surgeon that he did not think radiography necessary in the fracture in question availed him little with a jury.

Occupational Eczema of Dentists. Series of articles in recent numbers of the *Zahnärztliche Rundschau* **39**: 1930.

A casual communication on this subject in No. 2 of this series has been followed by a considerable number of articles, mostly brief, that give the experience of other dentists. Dr. Felix Norgauer points out that this subject frequently comes before the dental public in the columns of dental periodicals and notably in the *Rundschau*. It is by no means a unit disease, for not only are the causal factors various but the clinical aspect is such as to include all possible lesions. Moreover, a great variety of measures has been recommended for both the prevention and the cure of the eczema, or as most would prefer to term it, dermatitis. One causal factor is formalin, and many dentists will not handle trikresol-formalin at all. Other substances definitely accused are carbolic acid, lysoform, etc. But cessation of the use of irritant antiseptics does not mean that the affection will heal up, so that some other factor must be concerned in the causation. Idiosyncrasy must play a rôle in some cases; so that it is of no value to accuse definite irritant antiseptics to the exclusion of other substances. One dentist who gave up the use of formalin found that the ethereal oils could produce the same effects. Even novocaine is not without its accusers. The

dentists do not seem to have consulted any of the well-known dermatologists about their skin troubles, although Norgauer is well enough versed to know that the fingers should not be washed with ordinary soap and water. At the first sign of itching or eruption on the fingers he rinses with alcohol and then excludes the air with vaseline thickly applied. If this does not abort the disease, he would accuse some constitutional factor and have the dentist take a metabolic cure in the shape of medicated spring waters.

Nutrition and Pediatrics

Food Factors Other Than Vitamin D in Rickets. William Weston. *J. A. M. A.* 94: 8, 1930.

Although not all the factors concerned in the etiology of rickets are known, Weston states that rickets is rare or nonexistent where the food supply is preponderantly of animal origin. Moreover, he is under the same impression, as some other observers of rickets, that the ingestion of a large proportion of cereals in the diet is more liable to lead to rickets. Weston cites the observation of Burton, who feels that the introduction of highly milled cereals into the diet of the Icelanders induced rickets in the infants and also resulted in dental caries in the adult population.

In regard to the treatment of rickets, the opinion is overwhelmingly in favor of the fact that irradiation is the most important factor that has been presented up to this time in the treatment of rickets.

Clinical Applications of Some Recent Advances in Endocrinology. J. Mirvish. *J. M. A. South Africa* 3: 19, 1929.

Mirvish reviews some of the more recent advances in the study of ductless glands. He mentions the work of Allen and Doisy, who found that an injection of an active ovarian extract produced estrus or heat phenomena in an ovariectomized rat or mouse. The ovarian preparation is then standardized according to the minimum amount required to produce estrus in such rat or mouse, and is designated the rat or mouse unit.

Reports are slowly accumulating in favor of administration of ovarian preparations in amenorrheal sterility and disturbance associated with menopause. From experimental evidence, ovarian extract is contraindicated in pregnancy, as it produces abortions in animals, but, on the other hand, attempts to produce therapeutic abortion in the human female by the administration of the follicular hormone have not proved successful.

Motility of the Empty Stomach in Normal and Malnourished Asthenic Children. Alice Rupp and Frederick W. Schultz. *Am. J. Dis. Child.* 39: 2, 1930.

In discussing the four types of bodily habitus, Mills describes the asthenic type of individual as a frail, slender physique, with long narrow thorax, short abdomen, light body weight, and delicate bony structure, a narrow intercostal angle, pendant heart and low gastrointestinal tract. Sauer, who has had con-

siderable experience with malnourished children, states that this description also holds true with children.

The motility of the empty stomach in normal and malnourished asthenic children was observed by these authors, and they used the method developed by Carlson by which a graphic registration of the movements of the stomach may be recorded.

Among their observations was the fact that compared with normal children the activity of the empty stomach is decreased in the malnourished asthenic children. Moreover, in malnourished asthenic children who have gastrointestinal symptoms, the motility is decreased still further.

The International Journal of Orthodontia, Oral Surgery and Radiography

PUBLISHED THE FIFTEENTH OF EVERY MONTH BY

THE C. V. MOSBY Co., 3523-25 Pine Blvd, St. Louis, Mo.

Foreign Depots—*Great Britain*—Henry Kimpton, 263 High Holborn, London, W. C.; *Australasia*—Stirling & Co., 317 Collins Street, Modern Chambers, Melbourne; *India*—"Practical Medicine," Egerton Street, Delhi; *Porto Rico*—Pedro C. Timothee, Rafael Cordero 68, San Juan, P. R.

Subscription Rates—Single copies, 75 cents. To anywhere in United States, Cuba, Porto Rico, Canal Zone, Mexico, Hawaii and Philippine Islands, \$7.00 per year in advance. Under foreign postage, \$7.40. Volume begins with January and ends with December of each year.

Remittances—Remittances for subscriptions should be made by check, draft, postoffice or express money order, or registered letter payable to the publishers, The C. V. Mosby Company.

Contributions—The editor will be pleased to consider the publication of original communications of merit on orthodontic and allied subjects, which must be contributed solely to this Journal.

Opinions—Neither the editor nor the publisher hold themselves responsible for the opinions of contributors, nor are they responsible for other than editorial statements.

Reprints—The publishers will communicate with authors regarding reprints upon publication of paper.

Communications—Contributed articles, illustrations, letter, books for review, and all other matter pertaining to the editorial department should be addressed to the Editor, Doctor Martin Dewey, 17 Park Ave., New York City. All communications in regard to advertising, subscriptions, change of address, etc., should be addressed to the publishers, The C. V. Mosby Company, 3523-25 Pine Blvd., St. Louis, Mo.

Illustrations—Such half-tones and zinc etchings as in the judgment of the editor are necessary to illustrate articles will be furnished when photographs or drawings are supplied by the authors of said articles.

Advertisements—Objectionable advertisements will not be accepted for publication in this Journal. Forms close first of month preceding date of issue. Advertising rates and sizes on application.

Change of Address—The publishers should be advised of change of subscriber's address about fifteen days before date of issue with both new and old addresses given.

Nonreceipt of Copies—Complaints for non-receipts of copies or requests for extra numbers must be received on or before the fifteenth of the month of publication; otherwise the supply is apt to be exhausted.

Entered at the Post Office at St. Louis, Mo., as Second-Class Matter.

EDITORIALS

The Dental Mechanic and the Dental Laboratory

IN THE spring of 1929 the dental profession in the State of New York was surprised to learn that a group of laboratory men had introduced a bill in the New York Legislature creating and licensing the so-called master dental technician.

This bill was the outcome of the influence which the dental laboratory men had gradually been exerting upon dental problems. The dental profession was divided in its opinion as to the value and necessity of such a bill. Finally a more or less inactive protest was made to the Department of Education of the State of New York, and the idea given to the profession was that the bill would not be passed.

As far as we know, almost the entire profession was taken unawares when they learned that the bill had been passed as an emergency measure at the request of the governor, and immediately signed. This was done regardless

of the fact that the bill had been pronounced unadministrative by those familiar with the rules of the Department of Education. It was realized then that the dental mechanics had "put one over" on the dental profession.

We think the greatest opposition from the dental profession was based upon the fact that the attitude of the dental technician was that of dictating to the profession and the public, instead of serving them.

This bill was not the first attempt of the laboratory men in New York State to secure legislation granting them a license to practice so-called "dental technology." Various arguments were given in favor of this bill. One of the principal arguments was that certain laboratory technicians were violating the Dental Practice Act by taking impressions for patients. These impressions were sometimes taken in the dental laboratory and sometimes in the dentist's office. In the latter case, according to the New York law, both the technician and the dentist were guilty of an unlawful act, despite the fact that the dentist was licensed. A certain group of men put this argument before the Board of Regents at a special hearing. Evidently the Board of Regents failed to see how the bill in question would alleviate unlawful practices. Another argument offered by the supporters of the bill was that certain laboratories were unhygienic and required regulation. This argument did not go very far because there are inspection laws, and the Health Department has ample authority to take care of such situations.

Since the dental laboratory does not come in direct contact with the public, there seems to be no necessity for licensing the technician. The laboratory does the work as outlined by the dentist. It is through the dentist that the patient receives the work. In other words, the quality of the work is sanctioned by the dentist before it reaches the patient. This would still be necessary under the technicians law as passed in 1929.

The public would not benefit by this law, in fact it might even prove to the detriment of the public. The control of the dental laboratories would be placed in the hands of a laboratory board. In time this would cause a laboratory monopoly. It was this feature that was most objectionable to the dental profession and to those of the public who were interested. Such "laboratory trust" would tend to increase the cost of service to the dentist and would in turn increase the cost to the patient, with no assurance that the patient would receive any better service than previously.

Another serious objection to this law was that it created the possibility of having this technicians law amended so that the laboratory would be able to do certain types of work without the supervision or assistance from the dentist. In other words, two types of dentists would be created with two different educational standards. It would seem rather unnecessary to raise the educational requirements of the doctor of dental surgery, if the master dental technician were allowed to get into the profession with less requirements. Of course the laboratory men said this was not their object, but it must be remembered that it was this group that promised to make no attempt to be licensed without consulting the profession.

At the meeting of the Dental Society of the State of New York held in 1929, the Society unanimously passed a resolution to work in favor of re-

pealing the Dental Mechanics Bill. A few in the profession seemed inclined to compromise, saying that the law was already on the statute books and that it would be difficult to repeal. However, the more aggressive of the profession, because of the arguments against the bill already stated, advised nothing less than repeal. The argument that proved there would be an increased cost of dental service was most effective with a legislature which is in favor of an old-age pension. The turning-point of the situation was caused by the dental profession in the smaller cities of New York, when they advised the dental laboratories that they could manage without them. Certain groups in these cities organized, formed laboratories and stopped patronizing the commercial laboratory. As a result of this, the laboratory owners were most anxious to have the bill repealed. Consequently the repeal bill passed both the Senate and the Assembly without a dissenting vote, and was signed by the governor.

This closes one chapter of the Dental Mechanics Act as regards New York State. However, what happened in New York will probably happen in other states. It was established on good authority that New York laboratory owners received financial support from large laboratories located in other parts of the United States. There was a desire to make a test case of the bill in New York, and in the great haste to push the bill through, it was so badly drawn up that it was impossible to administer it. Before the bill could be amended for use, tremendous opposition arose. Had the New York laboratory men succeeded in putting this bill into operation, they would probably have "killed the goose that laid the golden egg." We are thinking of what the dentists in the smaller cities had done to show their opposition, and wonder if their experiment could not be successful on a larger scale.

We would suggest that in the future the work be turned over to a laboratory that is controlled by the dental profession along a cooperative plan, rather than to an outside laboratory interested only in the financial end of the work.

Another question which must be decided in the future is the relation of the course for the dental mechanic, which has been organized in dental schools, to the course for the dentist. Several deans of dental schools have advised that the dental student should not be trained in any of the technical or laboratory work, as that work can be relegated to the student of dental mechanics. We believe such advice dangerous, and if adopted would produce a poorly educated and poorly equipped dentist, just as a medical student without a knowledge of work done in the physiologic, bacteriologic and pathologic laboratories, because such work can be turned over to the commercial medical laboratory, would make a poorly educated and poorly equipped medical practitioner.

To go back, New York State has succeeded for the present in removing a great obstacle to the development of the dental profession. However, we do not believe that the laboratory question is at an end, unless the dental profession realizes that laboratory work must be placed under the control of the profession, to which it belongs.

In Memoriam Resolutions

WHEREAS, It has pleased the Almighty God to call from this life our friend and coworker, George B. Palmer; and

WHEREAS, Through his death the New York Society of Orthodontists has lost one of its most esteemed members, who will be remembered for his optimism, for his sincerity, and as a congenial and loyal friend; therefore be it

Resolved, That the New York Society of Orthodontists express its deep sorrow at the loss of its fellow-member, and that these resolutions be recorded in the minutes; and be it further

Resolved, That a copy of these resolutions be conveyed to the family as an evidence of our sincere sympathy.

(Signed) Frederic T. Murlless, Jr.
E. Santley Butler.

Dr. H. B. Hamilton

Dr. Hamilton died in Ithaca, N. Y., on November 12, 1929, at the age of fifty-nine years.

Dr. Hamilton began the active practice of dentistry in Ithaca in 1894. He had practiced orthodontia there since 1914. However, in 1928 he was forced to give up practice completely because of failing health.

For a number of years prior to his death he had been suffering from poor health, but his perseverance and his devotion to his patients and his work kept him in practice until about a year before his death. For some time before he passed away he was quite helpless, and his greatest concern was for his wife who was also an invalid. Her death preceded his by a short time. He is survived by his mother, one sister, and one brother.

Dr. Hamilton was a member of the Delta Sigma Delta fraternity at the University of Pennsylvania. He was a prominent Mason, having held many high offices in the various branches of the fraternity. He was the founder of the Ithaca Craftsman's Club, the social order of the Masons and was later president of the Ithaca Masonic Club, its successor. He took active interest in the building of the new Masonic Temple at Ithaca.

Dr. Hamilton was prominent in his work and will long be remembered by the orthodontic profession. The New York Society of Orthodontists to show its regard for Dr. Hamilton has formulated the following resolution:

WHEREAS, The Infinite has seen fit to take Dr. Hamilton from his trials and tribulations, and

WHEREAS, The New York Society of Orthodontists has lost a devoted friend and member, be it therefore

Resolved, That the Society express its sympathy by spreading these resolutions upon its minutes and by sending to his relatives this indication of our regard for Dr. Hamilton.

RESOLUTIONS OF THE AMERICAN SOCIETY OF ORTHODONTISTS

WHEREAS, The correction of dental abnormalities in children is essential to their health and well-being, and the need for such care is very apparent among the children of our schools; and

WHEREAS, School authorities in many cities maintain free dental clinics to care for the children of the poor who require such services and have the full cooperation of school principals and school-teachers to the end that such children are sent during school hours for such care without loss of school attendance; and

WHEREAS, The children of taxpayers who patronize private dentists and thereby relieve the schools of the expense incidental to such care are not given the same degree of cooperation from school authorities in meeting this health problem; and

WHEREAS, Children who have spent the entire day in school are unfit subjects for difficult or protracted dental operations nor can such operations be properly and efficiently done under these conditions; and

WHEREAS, The prerogative of parents to keep children out of school for such important and necessary care frequently leads to friction with teachers; therefore be it

Resolved, That the American Society of Orthodontists does urgently request all agencies interested in child welfare to give consideration to this problem and to use their influence to the end that the children of taxpayers may have the cooperation of school authorities in meeting this important health problem; and be it further

Resolved, That this resolution shall be spread upon our minutes and copies sent to the leading medical and dental journals and their publication requested.

NEWS AND NOTES

The Second International Orthodontic Congress

It will be within the recollection of many of the readers that the First International Orthodontic Congress was held in New York in 1926. It has been decided that the Second International Orthodontic Congress shall take place in London about the middle of July, 1931.

The object of the Congress is the advancement of the Science of Orthodontics and its practical application. It is hoped that orthodontists and dental practitioners from all parts of the world will attend.

Information regarding travelling facilities and hotel accommodation may be obtained from the official agents to the Congress, Messrs. Morgan Pope & Co., of 7, St. James's Street, London; 6, Rue Caumartin, Paris; 71 Vanderbilt Avenue, New York; Messrs. Noel Vester & Co (Agents) 44, Unter den Linden, Berlin.

Further details will be published later as organization proceeds.

J. H. BADCOCK, President-General.

A. C. LOCKETT,

B. MAXWELL STEPHENS,

Secretaries-General.

Dental Society of the State of New York

PRELIMINARY PROGRAM OF THE ANNUAL MEETING

The Dental Society of the State of New York will hold its sixty-second annual meeting in New York City, May 12, 13, 14, 15, and 16, 1930. All literary exercises, clinics and commercial exhibits will be held at the Hotel Commodore. The facilities at this hotel, as many may recall, are of such a character that practically all activities of the meeting (including commercial exhibits) are held on one floor. Dr. Thomas C. Swift, 1 Park Ave., Mt. Vernon, N. Y., is the chairman of the exhibit committee. Dr. Harvey J. Burkhart, 800 E. Main Street, Rochester, N. Y., is the chairman of the program committee, and Dr. J. W. Schelpert, 30 Cottage Ave., Mt. Vernon, N. Y., is the chairman of the clinic committee. Any information regarding the above three departments should be addressed directly to the chairmen of the respective committees.

The first two days of the session, Monday and Tuesday, May 12 and 13, will be devoted to educational clinic classes, and the following subjects will be covered:

Root Canal Therapy Course by Guy P. Bannister, Cleveland, Ohio, and Arthur B. Crane, Washington, D. C.

Operative Dentistry (Inlay) by W. Elliott Taylor, New York City, and Frank Cole, Herbert S. Bailey, New York City.

Operative Dentistry (Amalgam) by William R. Pond, Rutland, Vt., (Gold Foil) by LeRoy L. Hartman, New York City.

Ceramics by Wm. J. Meier, New York City, and H. S. Both, New York City.

Removable Bridge Work by S. Marshall Weaver, Cleveland, Ohio, and Milton Cohen, New York City.

Fixed Bridge Work by James K. Burgess, New York City, and Emory C. Thompson, Buffalo, N. Y.

Clasp Attachments for Partial Dentures and Removable Bridge Work by Forry R. Gets, New York City, and Lee G. Pollock, New York City.

Partial Denture Construction by Geo. P. Phillips, Boston, Mass., and Clyde H. Schuyler, New York City.

Full Denture by Arthur T. Rowe, New York City, and Frank A. Fox, Philadelphia, Pa.

Dietetics by Sherman W. Davis, Indianapolis, Ind.

Diseases of the Mouth and Their Treatment by J. L. Appleton, Jr., Philadelphia, Pa., and James E. Aiguier, Philadelphia, Pa.

Periodontia by T. B. Hartzell, Minneapolis, Minn., and Harold J. Leonard, New York City.

Orthodontia, under the direction of Dr. Eby, Monday and Tuesday mornings.

Radiography and Photography by Ralph S. Voorhees, Rochester, N. Y.

ORAL SURGERY

Monday, Tuesday, and Wednesday, May 12, 13, 14.

Mornings and Afternoons

Under the direction of: Harold S. Vaughan, Henry S. Dunning, Adolph Berger, Leo Winter, Douglas B. Parker.

Some of these classes will be of only one session, three hours and a half; others will be of two sessions of three hours each. The fee for these classes, although not definitely settled in each case will be lower than it has at any previous occasion.

On the literary program we will have contributions from: Dr. George Winter of St. Louis; Dr. John V. Mershon of Philadelphia; Dr. Thomas B. Hartzell of Minneapolis; Dr. Sherman W. Davis of Indianapolis; Dr. J. L. Appleton, Jr., of Philadelphia; and important reports from the scientific committee and also from the Bloomingdale Hospital of New York. At the banquet which will be held on Thursday evening, May 15, we will have in addition to Dr. John V. Mershon the recipient of the Jarvie Fellowship Medal, Colonel Robert T. Oliver, president-elect of the American Dental Association. Friday morning for a period of four hours will be devoted to general clinics.

During the time of the meeting, sessions of the Dental Hygienists Association and the Dental Assistants Association will be held on the mezzanine floor of the hotel. The executive council will convene on Tuesday, May 13, at 2:30 P.M.

WILLIAM C. FISHER, President,

A. P. BURKHARDT, Secretary,

57 E. Genesee St.,
Auburn, N. Y.

The Dental Hygienists' Association of the State of New York

The New York State Dental Hygienists' Association will hold its tenth annual meeting May 13 to 16 inclusive, at the Hotel Commodore in New York City.

Members of the dental profession, dental hygienists and dental assistants are cordially invited to attend the sessions during these days. An interesting literary and clinical program will be presented which should be particularly stimulating and helpful to the hygienist. Both members and nonmembers are urged to be present at this anniversary meeting.

The program will include the following speakers: Dr. Alfred Walker, Dr. Marion Lerrigo, and Dr. Rose Schwartz.

MARIE COPP, Chairman Publicity,
New York City.

The Eastern Association of Graduates of the Angle School of Orthodontia

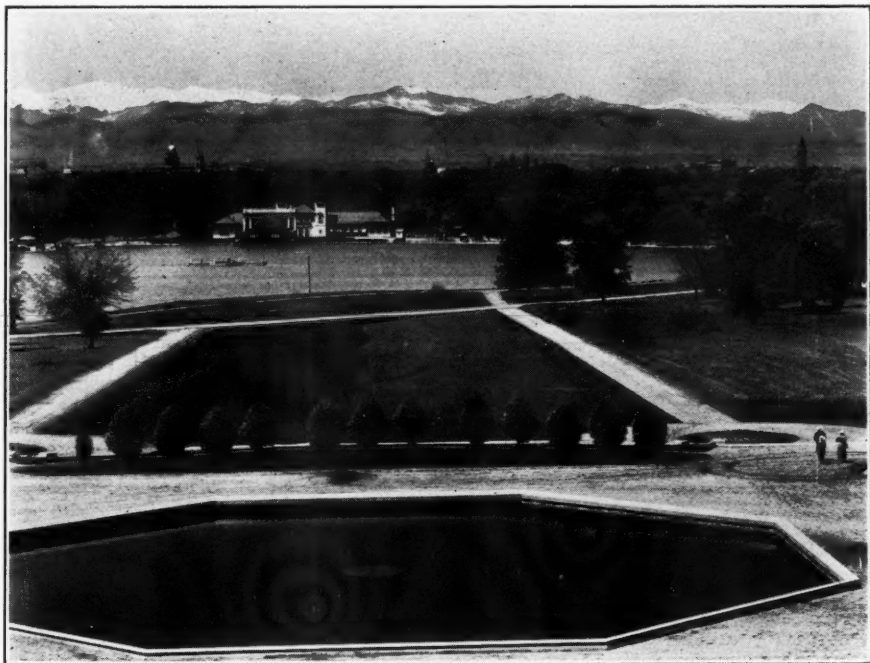
The annual meeting will be held in New York City, at the Vanderbilt Hotel, on Monday and Tuesday, May 5 and 6, 1930.

Odontologic Institute of Santos

The General Assembly of Janeiro has elected the following board of directors for the Odontologic Institute of Santos, State of Sao Paulo, Brazil, for 1930: Dr. Arthur do Prado Dantas, president; Dr. José Luis de Mendonça, vice-president; Dr. Tito de Barros, Jr., first secretary; Dr. Antonio Marino, second secretary; Dr. Joaquim Gomes da Fonseca, first treasurer; Dr. Ramiro Bezerra da Rocha, second treasurer; Dr. Mario Capp, librarian; Drs. Antonio Maia, Clineu Paim, David Pol Fernandes, Fausto Saddi, counsellors.

American Dental Association Convention to be in Denver**COMBINE DENTISTRY WITH PLEASURE**

From everywhere romance trails lead to Colorado's captivating city of conventions. Centrally located in the United States, Denver offers as inducements uniform mileage and



VIEW FROM COLORADO MUSEUM, CITY PARK, DENVER, COLORADO

equable convention expenses. There is unexcelled transcontinental train service, and all highways lead to the scenic gateway city in the shadow of the Rockies.

Denver's mile-high elevation gives assurance of convention sessions in comfort, while the proximity to the high hills is an incentive to bring the entire family and combine the convention with a vacation outing.

Every waking moment can be filled with seeing or doing something of unusual interest. There are boating and swimming. And have you ever enjoyed a game of golf over a sporty mountain course at an altitude of nine or ten thousand feet? Then there are hiking, horseback riding and fishing. Also there is motoring over splendid mountain roads or even skiing in July.

COME UP TO COLORADO TO THE MILE-HIGH CONVENTION, JULY 21-25, 1930

This will be the busy season of the year, so make your reservations early. For hotel and travel information write Local Committee, A. D. A., 1222 Republic Building, Denver, Colorado.

Florida State Dental Anesthetist Society

To the Editor:

I notice in the January issue of your journal that there has been organized a society for the advancement of general anesthesia in dentistry by a group of New York dentists.

I note that this organization claims to be the only one of its kind in the world, and I beg to inform you that we have had such a society in this state for the past six years. We have our annual meeting the day before the regular state society convention; also we have had a number of special meetings when some outside clinicians happened to be in the state. Several of the papers which have been read before our society have been printed in various dental journals over the country.

Will you please be fair by correcting the statement that the New York Society is the first of its character in the world?

Thanking you, I beg to remain

Very truly yours,

(Signed) A. M. SMITH, JR., Secretary,
Tampa, Florida.

Notes of Interest

Dr. W. F. Wilson announces the removal of his offices to 10465 Carnegie Ave., Cleveland, Ohio.

Dr. T. Wallace Sorrels and Dr. Harry H. Sorrels announce the removal of their offices to Suite 1108, Medical Arts Building, Oklahoma City, Okla.

Dr. Varney E. Barnes and his associates, Dr. Frank L. Evans and Dr. Henry Barnes, announce the removal of their offices to 1704 Medical Arts Building, Cleveland, Ohio.

Dr. Felix A. Racette announces the removal of his office to Suite 903, Hanselman Building, Kalamazoo, Mich. Orthodontia exclusively.

Dr. Julius C. Swarts, orthodontist, announces the opening of his office at 516 Southern Surety Building, Des Moines, Iowa.

